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MINING LAWS OF 1872 AND 1989

HEARING

BEFORE THE

SUBCOMMITTEE ON MINERAL RESOURCES
DEVELOPMENT AND PRODUCTION

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

S. 1126

TO PROVIDE FOR THE DISPOSITION OF HARDROCK MINERALS ON FEDERAL LANDS, AND FOR OTHER PURPOSES

JUNE 7, 1989

Printed for the use of the
Committee on Energy and Natural Resources

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MINING LAWS OF 1872 AND 1989

WEDNESDAY, JUNE 7, 1989

U.S. SENATE,
SUBCOMMITTEE ON MINERAL RESOURCES
DEVELOPMENT AND PRODUCTION,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The subcommittee met, pursuant to notice, at 2:35 p.m. in room SD-366, Dirksen Senate Office Building, Hon. Jeff Bingaman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

Senator BINGAMAN. This afternoon marks the first hearing in Washington this season by the Subcommittee on Mineral Resources Development and Production. I would like to welcome everyone with us today and look forward to the subcommittee taking an active role in many important issues that affect mineral resources during this Congress.

Today we are here to receive testimony on the Mining Law of 1872 and legislation introduced by Senator Bumpers that establishes a regime for the disposition of hard rock minerals on Federal lands.

I look forward to receiving testimony from many parties interested in this subject. While other commitments will unfortunately prevent me from being here for all the testimony this afternoon, I will look forward to reviewing all the comments received.

The Mining Law of 1872 holds a special place in history as legislation from the era of the Homestead Act. The Mining Law has played an important role in the settlement of the West and the development of this Nation's mineral wealth which has been so important to our economic health.

Our standard of living and our national security are heavily dependent upon the availability of these minerals. In my home state of New Mexico, the total value of nonfuel mineral production is estimated to be over $1 billion for 1988, a 37 percent increase from 1987. That is chiefly attributable to an increase in the price of copper.

Employment in my state in the nonfuel mining industry totaled 4,329 in 1988, nearly half of the 9,000 who were employed in 1981. Likewise, total U.S. employment in the metal mining steel and primary nonferrous metals industry dropped from 628,000 in 1980 to 342,000 in 1986.

While the industry is picking up somewhat due to increased mineral prices, I want to be sensitive to the impact that any legislative change might have on an industry struggling to make a comeback. I believe that public land mineral policy needs to encourage exploration, development and production of minerals on Federal lands in a manner that reflects the national interest.

While the national interest in continuing to develop mineral resources in public lands has not changed, I would think everyone in the room would agree that the context in which such mineral development occurs has changed since 1872. As a Nation, we no longer encourage the disposal of publicly owned lands.

As a Nation, we believe that the Federal Government should receive a fair return for resources that are owned by all Americans; and as a Nation, of course, we want our children and grandchildren to inherit a healthy environment.

The United States needs a hardrock mining regime that both encourages mineral production and ensures that these other public policy goals are met. I am interested in learning from today's witnesses whether or not the Mining Law of 1872 meets all of these policy objectives and, if not, how these objectives can be met in a reasonable fashion.

[The text of S. 1126 follows:]

II

101st CONGRESS
1st Session

S. 1126

To provide for the disposition of hardrock minerals on Federal lands, and for other purposes.

IN THE SENATE OF THE UNITED STATES

June 6 (legislative day, January 3), 1989

Mr. Bumpers (for himself, Mr. Fowler, Mr. Riegle, Mr. Pryor, Mr. Dixon, Mr. Sasser, Mr. Ford, and Mr. Levin) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To provide for the disposition of hardrock minerals on Federal lands, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SEC. 101. SHORT TITLE.

That this Act may be referred to as the "Mining Law of 1989".

TITLE I—DEFINITIONS

SEC. 102. DEFINITIONS.

When used in this Act—

(1) "contiguous group of claims" means an area of land in which a hardrock mineral deposit can be explored for in an efficient, economical, and orderly manner as a unit with due regard to conservation of the mineral deposit and other resources; a contiguous group of claims may consist of one or more claims, and may include intervening or adjacent lands in which the United States does not own the mineral resources, but all the lands in a contiguous group of claims must be under the effective control of a single operator, be able to be developed and operated as a single operation, and be in reasonable proximity;

(2) "contiguous group of patents" means an area of land in which a mineral deposit can be developed in an efficient, economical, and orderly manner as a unit with due regard to conservation of the mineral deposit and other resources; a contiguous group of patents may consist of one or more patents, and may include intervening or adjacent lands in which the United States does not own the mineral resources, but all the lands in a contiguous group of patents must be under the effective control of a single operator, be able to be developed and operated as a single operation, and be in reasonable proximity;

(3) "exploration" means to utilize methods and techniques which cause more than minimal disturbance to the environment for the determination of the characteristics of a potential hardrock mineral deposit;

(4) "exploration plan" means a plan for the exploration of hardrock mineral deposits in the locatable lands and for the reclamation of such lands, approved by the Secretary, or, for National Forest lands, the Secretary of Agriculture, pursuant to this Act;

(5) "hardrock minerals" means any mineral of a kind which on June 6, 1989, was subject to location under the Mining Law of 1872;

(6) "land and resource management plans" means plans pursuant to the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended (16 U.S.C. 1604), and the Federal Land Policy and Management Act of 1976, as amended (43 U.S.C. 1712);

(7) "locatable lands" means lands open to mineral entry pursuant to the Mining Law of 1872 as of date of enactment of this Act, with the exception of—

(A) lands recommended for wilderness designation by the surface managing agency;

(B) lands within Bureau of Land Management wilderness study areas;

(C) lands designated by Congress as wilderness study areas, except where mineral entry under the Mining Law of 1872 is specifically allowed to continue by the statute designating the study area;

(D) lands within areas allocated for wilderness or further planning in Executive Communication 1504, Ninety-Sixth Congress (House Document numbered 96–11), unless such lands are allocated to uses other than wilderness by a land and resource management plan or have been released to uses other than wilderness by an act of Congress; and

(E) lands withdrawn from mineral entry subsequent to the date of enactment of this Act pursuant to withdrawal authority granted by the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 et seq.) or any other Act.

Any lands excluded from mineral entry pursuant to paragraphs (A) through (E) of this subsection for which there is a final determination that such lands not be designated as wilderness or for which a withdrawal is revoked may be open to mineral entry pursuant to this Act;

(8) "mined area" means surface and subsurface of locatable lands in which exploration, development, or production pursuant to this Act are being or have been conducted, including ways and roads appurtenant to any such area, land excavations, refuse banks, tailing ponds, spoil banks, and areas in which structures, facilities, equipment, machines, tools, or other materials or property which result from or are used in, mining operations;

(9) "minimal disturbance to the environment" means those activities which do not cause more than minor, short-term alteration of the environment;

(10) "mining and reclamation plan" means a plan for the development and production of hardrock mineral deposits in the locatable Federal lands and for the reclamation of such lands, approved by the Secretary, or, for National Forest lands, the Secretary of Agriculture, pursuant to this Act;

(11) "Mining Law of 1872" as used in this Act means the general mining laws of the United States (30 U.S.C. 21–54), as amended and supplemented;

(12) "paying quantities" means that quantity of hardrock minerals which would pay a profit, if the mine were operated and the minerals marketed;

(13) "person" means citizens, corporations organized under the laws of the United States, or of any State or the District of Columbia, or governmental units, including, without limitation, municipalities;

(14) "prospecting" means the preliminary search for and identification of hardrock mineral resources which causes only minimal disturbance to the environment; and

(15) "Secretary" means the Secretary of the Interior.

TITLE II—DISPOSITION OF MINERAL DEPOSITS

SEC. 201. PROSPECTING.

Prospecting may be conducted on locatable lands subject to the rules and regulations of the Federal surface managing agency. Any person proposing to engage in any prospecting activity shall notify the surface managing agency prior to initiating any such activity.

SEC. 202. EXPLORATION CLAIMS.

(a) All locatable lands shall be open for location of an exploration claim pursuant to this section. The exploration claim location shall conform with the United States system of public land surveys, where possible, and shall be made in a manner as prescribed by the Secretary. Mining claims shall be twenty acres in size. The claimant may apply to the Secretary or, for National Forest lands, the Secretary of Agriculture, for the use of additional Federal land pursuant to section 205 of this Act.

(b) Federal location and filing requirements imposed by this section shall supersede any conflicting State location and filing requirements, and shall supersede the filing requirements of section 314 of the Federal Land Policy and Management Act of 1976 (30 U.S.C. 1744). The holder of an exploration claim located pursuant to this Act, within ninety days after the date of location of such claim, shall file with the Secretary a notice of location, including the geographic location of the claim and the hardrock mineral or minerals for which the claim is being located, and shall pay a recordation fee of $100 per claim. The filing of such location notice grants the claimant the exclusive right to explore for any hardrock minerals within the vertical boundaries of such exploration claim, together with the right to use so much of the surface of the exploration claim as may be reasonably necessary for exploration purposes, subject to such reasonable regulations as the Secretary, or for National Forest lands, the Secretary of Agriculture, may prescribe.

(c) The owner of an exploration claim located pursuant to this Act shall, in addition to any other filing requirements of this section, make the filings and payments required pursuant to subsection 204(e) of this Act.

(d)(1) Prior to taking any action which causes or may cause more than minimal surface disturbance, the claimant shall submit an exploration plan to the Secretary, or, for National Forest lands, the Secretary of Agriculture, for approval pursuant to this section. The plan may include a contiguous group of claims. The Secretary or, for National Forest lands, the Secretary of Agriculture, shall approve the exploration plan unless the Secretary determines that the activities pursuant to such plan cannot be conducted in accordance with all applicable laws and applicable land use plans. The Secretary may require that the plan be modified. Upon disapproval of such plan, the exploration claim shall be deemed to be null and void by operation of law.

(2) Each exploration plan shall include the name and legal mailing address of the claimant (and operator, if not the claimant) and their lessees, assigns, or designees, if any; a plan of reclamation pursuant to the requirements of section 301 of this Act; and such conditions as the Secretary may require, including conditions for the protection of the environment. Under the exploration plan, the claimant may remove a reasonable amount of the hardrock minerals for analysis, study and testing, but the claimant may not remove any mineral for sale, nor conduct any activities other than those required for exploration for hardrock minerals.

(3) Any modification of the exploration plan shall be approved by the Secretary or, for National Forest lands, the Secretary of Agriculture.

(e) The lands subject to an exploration claim shall not be used for any purpose other than mineral exploration. Any person using such lands for any other purpose shall be subject to a fine of not more than $1,000 for each day of violation and the claim shall be deemed null and void by operation of law.

SEC. 203. MINERAL PATENTS.

(a) The holder of an exploration claim for which an exploration plan was issued under this Act shall submit an application for a mineral patent, pursuant to such regulations as the Secretary establishes, prior to the initiation of any development or production activities.

(b) Any exploration claim or claims shall be conclusively presumed to be abandoned and shall be deemed null and void by operation of law at the end of ten years unless the holder of such claim or claims has submitted an application for a patent under subsection (a) of this section. At the claimant's election, the claimant shall notify the Secretary at any time during the ten-year period that the claimant is abandoning the claim, and such claim shall be void upon the Secretary's receipt of such notice.

(c) The holder of an exploration claim under subsection (a) shall be entitled to a patent upon the Secretary's determination that—

(1) the exploration claim or claims contain a substantial hardrock mineral deposit capable of commercial development; and

(2) the holder of the claim has filed a mining and reclamation plan pursuant to subsection (f) of this section with the Secretary, and such plan has been approved by the Secretary or, for National Forest lands, the Secretary of Agriculture, and filed with the Secretary. The Secretary or, for National Forest lands, the Secretary of Agriculture, shall approve the mining and reclamation plan unless such Secretary determines that the activities pursuant to such plans cannot be conducted in accordance with all applicable laws and applicable land and resource managment plans.

(d) Upon the determination of the Secretary under subsection (c), the claimant shall be entitled to the issuance of a mineral patent which shall include only the hardrock minerals in the claim, together with the right to use so much of the surface of the exploration claim as may be reasonably necessary for mining purposes, subject to such reasonable regulations as the Secretary, or, for National Forest lands, the Secretary of Agriculture, may prescribe, including an annual surface use fee of not less than $5 per acre, and subject to the reservation to the United States of an overriding royalty of 8 per centum of the value of hardrock mineral production. The mineral patent shall revert to the Federal Government if production of hardrock minerals in paying quantities has not begun within fifteen years of patent issuance, or upon termination of production. Production of hardrock minerals in paying quantities may be suspended for a reasonable amount of time if market conditions do not warrant continued extraction, upon approval of the Secretary and upon payment in lieu of labor pursuant to section 204.

(e) The lands and minerals subject to such mineral patent shall not be used for any purpose other than mining or processing and uses reasonably incident to mining or processing. Any person using such lands for any other purpose shall be subject to a fine of not more than $1,000 for each day of violation and the mineral patent shall revert to the United States.

(f) A mining and reclamation plan shall include, but not be limited to, the following:

(1) the name and legal mailing address of the claimant (and operator, if not the claimant) and their lessees, assigns, or designees, if any;

(2) identification of the exploration claims included in the patent application;

(3) existing or proposed routes of access to the claim, including aircraft landing areas;

(4) a description of the known and inferred boundaries of the hardrock mineral deposit, the quantities and grades of proven and probable mineral reserves contained therein, and the test results and data from which such information is derived;

(5) the planned location of excavations, tunnels, surface facilities, and all other uses of the surface and subsurface of the exploration claims;

(6) a description of the types and capacities of the equipment and facilities which the owner anticipates using to mine the mineral deposit;

(7) a description of reclamation activities of the mined areas pursuant to the requirements of section 301 of this Act;

(8) the contemplated time schedule of each phase of mine development, facility, and plant construction, and commencement of mineral production;

(9) measures to be taken during extended periods of nonoperation to maintain the area;

(10) an estimate of the total investment to be made before mineral production is commenced; and

(11) the manner of compliance with Federal, State, and local laws and regulations.

(g) Any modification of the mining and reclamation plan shall be subject to approval by the Secretary or, for National Forest lands, the Secretary of Agriculture.

SEC. 204. DILIGENCE.

(a) No less than the following amounts shall be expended each year on an exploration claim or a mineral patent for annual labor in furtherance of the development of hardrock minerals in accordance with the exploration plan pursuant to subsection 202(d) of this Act or a mining and reclamation plan pursuant to subsection 203(f) of this Act:

(1) $50 per acre per exploration claim or contiguous group thereof, or $100 per acre per mineral patent or contiguous group thereof, during years one through five;

(2) $100 per acre per exploration claim or contiguous group thereof, or $200 per acre per mineral patent or contiguous group thereof, during years five through ten;

(3) $300 per acre per mineral patent or contiguous group thereof, during years ten through fifteen. Such annual labor may be performed on or for the benefit of any part of an exploration claim or mineral patent or a contiguous group of exploration claims or contiguous group of mineral patents.

(b) At the claimant's election, in lieu of performing annual labor, the claimant may make payments in an amount equal to such annual labor not actually performed (hereinafter referred to as "payment in lieu of labor"), and such payment in lieu of labor shall satisfy the requirements of this section.

(c) Annual labor and payment in lieu of labor made on or for an exploration claim or mineral patent or a contiguous group of exploration claims or a contiguous group of mineral patents during any one year in excess of the amount of annual labor required for those claims or patents during that year may be applied during subsequent work years to satisfy the annual labor for the same claims or patents.

(d) Annual labor or payments in lieu of labor requirements shall cease upon production of hardrock minerals in paying quantities and the payment of the overriding royalty pursuant to subsection 203(d).

(e) The holder of an exploration claim or a mineral patent shall file with the Secretary each and every year the following:

(1) an annual holding fee of $100 per exploration claim or mineral patent; and

(2) proof of the annual labor or the payment in lieu of labor. The Secretary shall determine each and every year that either the annual labor has been performed or that the payments in lieu of labor have been

made as required under this section. Upon the determination of the Secretary that such requirements have not been met, the exploration claim or mineral patent shall be deemed conclusively to be abandoned and shall be null and void by operation of law.

SEC. 205. USE OF FEDERAL SURFACE.

The claimant may submit to the Secretary an application for the use of the surface of lands other than those referred to in subsections 202(b) and 203(d) which are required to support mineral development and production activities on the claim or patent. The Secretary shall approve such application upon determining that the lands are required to support mineral development and production activities, upon payment of an annual surface use fee of no less than $5 per acre, and upon such terms and conditions as may be prescribed, including requirements for the reclamation of such lands in accordance with the standard set forth in subsection 301(b) of this Act.

SEC. 206. FEDERAL RESERVATION OF RIGHTS.

(a) The United States reserves all rights to, and interests in, locatable lands, with the exception of the hardrock minerals covered by a valid mineral patent issued pursuant to this Act, subject to the overriding royalty provided for by subsection 203(d).

(b) Exploration claims and mineral patents located pursuant to this Act shall be subject to the requirements of the Multiple Mineral Development Act (30 U.S.C. 521–531), as amended by this Act, and the Surface Resources Act (30 U.S.C. 601–615), as amended by this Act.

SEC. 207. ASSIGNMENTS.

(a) Any exploration claim or mineral patent may be assigned or transferred to any person pursuant to regulations to insure compliance with requirements of this Act.

TITLE III—ENVIRONMENTAL PROTECTION

SEC. 301. REGULATIONS AND RECLAMATION.

(a) The Secretary or, for National Forest lands, the Secretary of Agriculture, shall issue regulations which shall insure that all prospecting, exploration, development and production pursuant to this Act are conducted in a manner so as to minimize adverse impacts on the environment and in compliance with all applicable Federal and State laws and applicable land and resource management plans.

(b) Reclamation shall be required for all mined areas under standards to restore the land affected to a condition capable of supporting the uses which it was capable of supporting prior to any mining. Reclamation shall be conducted concurrently with operations if feasible. Reclamation standards shall address, but not be limited to, the following: topsoil replacement, revegetation, soil and slope stability, pit backfill, ground water recharge capacity, surface water quality protection, leach pad stabilization and neutralization, safe disposal of hazardous and toxic materials, and protection of groundwater and surface water quality.

SEC. 302. BONDS.

After approval of an exploration or mining and reclamation plan, and prior to surface disturbance activities pursuant to such plan, the owner of an exploration claim or mineral patent shall be required to file with the Secretary, or, for National Forest lands, the Secretary of Agriculture, a performance bond in an amount sufficient to insure complete and timely reclamation of the mined area. The bond shall be conditioned upon compliance with the exploration and mining and reclamation plans required pursuant to this Act and all applicable laws and regulations.

SEC. 303. AMENDMENTS TO LAND AND RESOURCE MANAGEMENT PLANS.

The Secretary, or in the case of National Forest Lands, the Secretary of Agriculture, shall, in the preparation, revision, or amendment of land and resource management plans pursuant to section 202 of the Federal Land Policy and Management Act or section 6 of the Forest and Rangeland Renewable Resources Planning Act, consider current and potential mineral exploration and development activities and provide, where appropriate, for terms and conditions under which such activities shall occur, including prohibitions on certain types and classes of activities, to assure protection of nonmineral values and resources.

TITLE IV--DISPOSITION OF RECEIPTS

SEC. 401. GENERAL.

(a) All receipts from surface use fees, payments in lieu of labor, and overriding royalties shall be paid into the Treasury of the United States; 50 per centum thereof shall be paid by the Secretary of the Treasury to the State within the boundaries of which the hardrock mineral deposits are or were located, and 50 per centum to miscellaneous receipts in the Treasury.

(b) All receipts from recordation fees pursuant to subsection 202(b), and annual holding fees pursuant to subsection 204(e)(1), shall be distributed to the surface managing agency for the lands on which the exploration claim or mineral patent for which the fees are paid are located, and are to be used solely for the administration of this Act.

TITLE V—EXISTING CLAIMS

SEC. 501. NEW CLAIMS AND PATENTS.

(a) Notwithstanding any other provision of law, as of June 6, 1989, no new mining claims shall be located pursuant to the Mining Law of 1872.

(b) Notwithstanding any other provision of law, with respect to any mining claim located pursuant to the Mining

Law of 1872, no patent for such claim shall be issued after June 6, 1989, except for those claims for which a patent application had been filed and all requirements for a patent had been fully complied with by such date.

SEC. 502. EXISTING CLAIMS.

(a) The owner of any valid mining claim located pursuant to the Mining Law of 1872 shall make an election under subsection (b) or (c) of this section. The election shall be made within three years after the date of enactment of this Act. Failure to make an election within such period shall be deemed conclusively to constitute an abandonment of the claim and the claim shall be null and void by operation of law. No later than sixty days after the enactment of this subsection, the Secretary shall notify the owner of each such claim of the election required pursuant to this subsection.

(b) The holder of a mining claim required to make an election under this section may elect to relocate such claim pursuant to the requirements of this Act. Such relocated claim must be relocated within sixty days after such election and shall be administered pursuant to the applicable provisions of this Act, except as follows:

(1) The annual holding fee required pursuant to subsection 204(e)(1) or the annual surface use fee pursuant to subsection 203(d) shall not apply.

(2) The annual labor or payments in lieu of labor as required pursuant to section 204 shall be one-half of the amounts specified in section 204.

(c) The holder of a mining claim required to make an election under this section may elect to maintain the claim by complying with the mining laws of the United States in effect at the date of enactment of this Act, including the following:

(1) Notwithstanding any other provision of law, commencing three years after the date of enactment of this provision, on each claim $5,000 shall be performed or improvements made during each and every year, or the holder of the claim may make payments in lieu of annual assessment work of $5,000 per claim per year. The Secretary shall determine each and every year that the work has been performed or the payment made. The failure to fulfill this requirement each and every year shall be deemed to conclusively constitute an abandonment of the claim.

(2) Notwithstanding any other provision of law, in addition to the requirements set forth in section 314 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1744), the owner of any unpatented mining claim shall file annually in the office of the Bureau of Land Management designated by the Secretary an affidavit of assessment work performed thereon. The fail-

ure to file the affidavit shall be deemed conclusively to constitute an abandonment of the claim.

(3) In addition to other applicable requirements, the owner of an unpatented mining claim shall be required to reclaim the site pursuant to subsection 301(b) of this Act and to post a bond pursuant to section 302 of this Act.

○

Senator BINGAMAN. We have good attendance today. Let me first defer to the ranking member of our full committee, Senator McClure, for any comment that he would have.

STATEMENT OF HON. JAMES A. McCLURE, U.S. SENATOR FROM IDAHO

Senator MCCLURE. Thank you very much, Mr. Chairman. This is an important subject matter, and I think it does deserve a careful look. We will begin consideration of legislation to reform the law which has governed the development of hardrock minerals on Federal public lands for over 100 years.

Having said that, I want to also reaffirm the fact that there have been literally dozens of other statutes enacted over the years since then that also affect mining on the public lands.

So I take that aside at the moment just to underscore the fact that we are not dealing with a body of law which is 100 years old. We are dealing with a body of law that originated over 100 years ago and has been developed over the years since that time into a very different complex of rules, regulations and conditions under which the mining industry operates on the public lands of today.

It is my view that the Mining Law has served this country well in the past and continues to do so today. The law ensures access for mineral discovery and guarantees those who discover valuable minerals the right to develop them. This element of the law is absolutely critical to the viability of the U.S. hardrock minerals industry.

Efforts to reform the 1872 Mining Law should not be driven by sensational headlines and misinformation. What is needed as the Congress takes up this issue is a clear understanding of the operation of the Mining Law and accurate information about the problems associated with it.

Last March, the General Accounting Office released a report requested by Congressman Rahall, the Chairman of the House Subcommittee on Mining and Natural Resources on the Mining Law's patent provision and annual assessment requirement. The report recommended that the Congress amend the law to eliminate the patenting of both hardrock minerals and the land required to mine them.

It is my view that the conclusions reached in the report are based upon technically inaccurate data which is due in great part to the fact that Representative Rahall asked that the land management agencies not be permitted to review or comment on the report before it was published.

Members of the House Interior and Insular Affairs Committee, including my Congressman, Congressman Craig, who is here today, have expressed similar concerns and have recently asked the Bureau of Land Management and the Forest Service to review the GAO report.

In addition, the American Mining Congress recently issued a rebuttal to the report which bolsters this Senator's belief that the recommendations made by the GAO are based upon very, very shaky facts.

I think it is extremely unfortunate that what might have been a useful document was hamstrung by denying GAO the access to the land managers who may have been able to correct the misinformation and enable GAO to provide informed recommendations.

One major premise of the GAO report is that patents are being obtained for purposes other than mining. Certainly I recognize that this is one of the major criticisms of the Mining Law, and it is an issue which needs to be dealt with.

I would like to make clear that this Senator will not defend anyone who attempts to utilize the location and patenting provisions of the 1872 act to acquire title to Federal lands for purposes other than mining.

One very simple method of dealing with this would be to include a reversionary clause in patents which would return patented lands to the Federal estate if they are used for anything other than mineral development. There is such a reversionary clause in the Recreation and Public Purposes Act, for railroad rights-of-way, and in many other instances. While I am not suggesting a particular amendment at this time, I am pointing out simply that massive revision is not always the solution to a particular problem.

In considering legislation to modify the Mining Law, there are some elements of the existing law which I believe are critical if we are to encourage the investment of time and private capital to identify and develop mineral deposits.

Specifically, I am referring to the location and patent system which protects a miner's right to locate and extract minerals. Mineral production is good for this country, providing jobs, additional tax base and metal availability. We must not become more dependent on foreign sources for minerals which can and should be produced at home. The location and patent system is critical to the viability of our domestic minerals industry.

Let me make it clear if I have not to this point that I am absolutely opposed to the creation of a leasing system for minerals currently locatable under the 1872 law. I see no value in strict diligence requirements, and I do not see any reason why claims should not be held.

I also believe that to impose royalties on hardrock mining operations, most of which are economically marginal, would merely shift a large block of those operations into the submarginal category.

Additionally, in order to obtain financing for a new mining operation, security of title to the minerals is necessary. I believe a lease to the minerals would prove to be a dubious title at best.

I feel very strongly that a leasing system would result in less exploration, fewer minerals discovered, and fewer minerals produced, and thus more dependence on foreign sources for minerals.

There are two issues associated with the Mining Law which I believe might be candidates for modification. The first is the prudent man's standard for discovery of a valid claim. Since mineral prices are driven by the world market and constantly fluctuate, I do not believe that rigid application of that standard is appropriate.

Second, I agree with those who propose a claimant should be able to pay a fee in lieu of the assessment work required by the 1872 law. I must add, however, that this should in no way be construed as support for the excessive diligence development payments envisioned by Senator Bumpers.

Serious consideration should be given, especially by those who are concerned by the environmental effects of mining operations, to permitting claimants who wish to simply hold their claim to pay a fee to the Federal Government rather than disturbing the land until they are prepared to actually mine the claim.

Finally, I would like to address the concerns of those who believe that the environmental effects of mining can only be mitigated by piling more and more statutes on the books. I believe that our existing laws, including the Clean Air Act, the Clean Water Act, the Federal Land Policy and Management Act, the National Forest Management Act, among others, provide adequate authority to assure environmentally responsible mining in the United States.

If there are problems with our environmental laws, then we should address them. Wholesale revision of the Mining Law to correct a few perceived abuses is likely to simply provide more litigation and frustrate the objective of the Mining Law, which is to encourage private development of the mineral potential of our Federal lands.

Mr. Chairman, I greatly appreciate your indulgence with my somewhat lengthy remarks, and I look forward to working with you and other members of the committee as we continue our review of this extremely important statute. Let us try to find the problems and then try to find the solutions to the problems that we find.

There are some who wish to appear and testify who because of the press of the committee's schedule were not on the witness list. I would ask unanimous consent that testimony particularly from the Western Mining Council and the National Inholders Association be received for the record.[1]

Senator **Bingaman**. We will be glad to receive that.

Let me just say at this point since we are on that subject that we are going to keep the hearing record open here for two weeks for additional statements that people may want to file who are not on the witness list today. We will be glad to do that.

Let me also call on Senator Bumpers and then Senator Burns to see if they have any statement they would like to make before we begin to hear from our witnesses.

Senator Bumpers, of course, is the primary sponsor on S. 1126, which would amend the Mining Law of 1872 very substantially.

STATEMENT OF HON. DALE BUMPERS, U.S. SENATOR FROM ARKANSAS

Senator **Bumpers**. Thank you, Mr. Chairman. I want to thank you also for holding the hearing today. We have scheduled this for a long time, and I appreciate the time you can spend with us today.

Mr. Chairman, let me say first of all just for the record that the 1872 Mining Law arithmetically, of course, is 117 years old. We initially gave the railroads up to six sections of land on both sides of a right-of-way to encourage them to build a transcontinental railroad. They did it, and they got very wealthy and are still getting wealthy off the coal on that land. I am not here to refight that battle.

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[1] The statements appear in Appendix II.

In 1872, the obvious and historical purpose of the Mining Law was to encourage people to go west and settle. The Mining Law was designed as a great incentive to attract people to the west.

Now nobody here today would argue that we are still trying to encourage people to go west. California does not know what it is going to do with the people it has now, let alone those who are coming. So it would be spacious in the extreme to suggest that the original purpose for this law still exists, but it is a shifting target.

As other attempts prior to mine have been made to revise this law, the arguments have changed. Now the argument is that we need minerals for strategic purposes and that it is in the interest of the people of this country to encourage mining of all kinds for hardrock minerals and so on.

I am not quarreling with the desirability of a hardrock minerals industry. Of course we need one. We need cooper and gold and silver. We need all of those minerals.

My efforts here go much deeper than that. I hope that the varying views on this committee regarding this law can be accommodated, and that some kind of a significant revision of the 1872 law can be worked out. I am not wedded to every provision of my bill.

I do want to say to the distinguished Senator and my good colleague from Idaho, Senator McClure, that this is not a bill that establishes a leasing system. On the contrary, it retains the location patent process. I think if I had thought it was doable I would probably have changed it to a leasing system.

It took me eight years to get Congress to pass a bill to stop leasing our onshore lands for oil and gas by lottery or for $1 an acre on a first come, first served basis. It never really mattered to me what the revenue from that bill was. The point was that the old system was powerfully unfair.

Now here I have tried to craft a bill that would at least allow the government to recover the cost of enforcing the mining law or of carrying it out.

It is designed to recover our costs, which seem to be minimal. I do not see how anybody could argue with that.

It is designed not to adversely affect legitimate miners who find a claim that they suspect has commercially producable minerals on it or under it.

I can tell you, it is designed to stop the increasing number of frivolous claims that are being filed and the outright frauds that are being perpetrated.

Here is an article from the Reno Gazette Journal dated June 4, 1989. Anthony Perchetti has a claim filed for 540 acres in the Yucca Mountain area. I forget how many claims that is, but now three years after he files those claims for 540 acres and paid $500 for them, DOE is going to pay him $249,000 to relinquish the claims. DOE says that the mineral potential under that 540 acres is nil.

Senator McClure. Would you yield on that?

Senator Bumpers. I would be happy to.

Senator **McClure**. If the mineral potential under the claims is nil, he has no valid claim under existing law.

Senator **Bumpers**. Why is DOE paying him $249,000?

Senator **McClure**. All I can suggest to you is that either DOE is being very, very frivolous with the taxpayers' money, which I do not discard as a possibility——

Senator **Bumpers**. I submit it is we who are being frivolous with the taxpayers' money.

Senator **McClure** [continuing]. Or that, indeed, they did not really mean it when they said there was no mineral value. It cannot be both.

Senator **Bumpers**. Obviously, the man who has the claim alleges otherwise. He thinks it has good value, but DOE says we do not care whether it does or not, we want these claims and we want them right now. They are paying $249,000 for them.

Senator, you have read the GAO report, and I am not going to go through that litany of horror stories in the GAO report about lands that were patented for $2.50 per acre that now have a value and in many instances have been sold for $10,000 to $13,000 per acre.

I trust that BLM will testify here today to the number of frivolous claims that are being filed simply because you can do it for $5.

I asked one Senator, I talked to him at length about co-sponsoring this bill. When I finally told him what it was all about, he said, hell, no, I am not going to co-sponsor it. I am heading for Nevada.

When you look at all those claims in the GAO report where people obviously never had any intention of mining, I think the Senator will agree with me that we do not have the money or the personnel, and I suspect Bob Burford will certainly verify that today. We do not have the personnel to monitor these claims and stay on top of them. If they did pay any attention, obviously some of these sales could not take place.

My point is this. I may be dead wrong, but I hope there are not very many people in this room and I dare say there certainly would not be very many in the Nation who think the United States Government ought to be in the business of selling land that belongs to all the taxpayers of the country for $2.50 per acre or $5.00 per acre.

Now under my bill, you can still get a patent to minerals. You cannot do it quite as cheaply as you could before. There are some user fee increases, and there is a royalty. It is designed to provide some returns to the federal government for federal resources.

As I said earlier, BLM very seldom requires a bond to insure reclamation. You go in and file your claims, and BLM does not even require a bond in case you start developing the claim. We have pictures galore of disastrous areas where miners have gone in and torn up the surface, found that it was a loser and then walked away from it. Because the United States Government did not so much as even require a bond before the surface was disturbed, we are going to pick up the tab for it.

I hope there are not many people in this room and I do not believe there are many in the Nation who think that is right, that the hardrock minerals are not subject to surface mining reclamation laws.

So we have already sold for $2.50 per acre or $5.00 a acre, depending on whether it is a placer claim or a load claim, a state the size of Connecticut. We have several patent applications pending right now for additional land. Unless somebody can come up with a very good reason not to, BLM is going to be literally required under the existing law to sell all of those claims for whatever amount of land it is for $2.50 per acre. Almost 6,000 acres was patented for somewhere between those two prices in 1988.

Mr. Chairman, there are no other resource values to be considered under the 1872 Mining Law. Under FLPMA and the National Forest Management Act, you must manage for multiple uses, and consider other resource values, recreation, grazing, whatever.

Under the 1872 law, BLM does not consider any other resource value. They only consider the mineral values. I don't think anybody agrees with that.

Finally, it is very difficult to know just what the return from mining would be if we had royalties as we do on coal, oil, and gas. We collect royalties on every single thing that comes out of the earth that belongs to the United States taxpayers except hardrock minerals.

In 1988, $13 billion worth of minerals was harvested in about 13 states where the United States Government owns anywhere from 30 to 85 percent of the land. Now nobody can tell you with any degree of assurance how much of the roughly $13 billion in minerals that were extracted last year came off Federal lands. The Wilderness Society makes a sort of a wild guess. They say it is $3.9 billion, $4 billion in round figures; $4 billion worth of minerals off Federal land, and the government received not one dime in royalties.

So let me go back to where I started, Mr. Chairman. I do not intend to be strident about this, but I must say the Mining Law reminds me of how my father used to say everybody's business is nobody's business. This is just one of those things that has been drifting through inertia all of these years.

Efforts have been made time and again to do something about it. Senator, I must say, you western Senators have always been able to kill any attempts to amend this. I know that in some of these western states, the 1872 Mining Law is the 11th Commandment, and I recognize the problems with changing it.

I am telling you, to allow this kind of an egregious situation to go on and literally invite increasing numbers of cases that the GAO catalog and catalog and catalog would be the height of irresponsibility on the part of the Congress.

Thank you, Mr. Chairman.

[The prepared statement of Senator Bumpers and the Reno Gazette Journal article follow:]

Statement of Senator Dale Bumpers
for the Record
Hearing on the Mining Law and S. 1126
Subcommittee on Mineral Resources Development and Production
June 7, 1989

Mr. Chairman, thank you for agreeing to hold these hearings today. Reform of the 1872 Mining Law is long overdue. Yesterday I introduced S.1126, a bill to modernize the laws which now apply to hardrock mineral development on lands owned by the United States. The bill was circulated to all the witnesses two weeks ago.

My interest in reforming the Mining Law of 1872 was heightened last Congress by the controversial Department of the Interior decision to issue patents to over 80,000 acres of land in the State of Colorado. The mining claims covering this vast acreage had been grandfathered in 1920 when Congress established a leasing system for oil shale, along with oil and gas. The Interior Department decided to sell these old claims for $2.50 an acre. Needless to say, this action caught my attention, and I began to look further at the law under which these claims were originally staked - the 1872 Mining Law. I found that law to be fraught with problems and announced my intention last fall to develop a proposal to revise it.

My legislation is intended to promote the efficient development of federal mineral resources in a manner which is consistent with federal policy towards public lands and resources and federal environmental protection policies. The current law governing hardrock mineral development was enacted over one hundred years ago and reflects the public lands policies of the Nineteenth Century. Like the Homesteading Laws, the Mining Law of 1872 encouraged U.S. citizens to move west and to settle the frontier, by offering the incentive of free lands and minerals from the public domain. Times have changed since that great westward migration and our attitude toward public lands and resources have changed dramatically. Yet the 1872 Mining Law remains -- the last vestige of these outdated policies. I believe that the law must be changed.

I am well aware that there have been attempts to revise the mining law in the past through the imposition of a leasing system and that these attempts have failed. I believe that my goal of modernizing the mining law can be achieved without creating a discretionary leasing system for hardrock minerals. I appreciate the historic and continuing importance of individual initiative in the area of mineral prospecting and believe that the principle of self initiation (i.e. the initiation of the mining exploration process by the miner) should be retained. I agree that miners should have security of tenure during the time period required to explore for minerals and to develop those minerals.

However, I cannot tolerate the retention of a system which permits the disposal of public lands through the patenting process, permits the extraction of valuable federal minerals without any direct return to the federal treasury, invites unauthorized uses of federal land, does not promote diligent exploration and development, and does not explicitly provide for protection of the environment.

In developing this legislation, I have been guided by the relevant principles enunciated in section 102 of the Federal Land Policy and Management Act of 1976. In that landmark legislation, Congress declares it to be the policy of the United States that:

> the public lands be retained in public ownership;
>
> the public lands and resources be inventoried and their use projected through a land use planning process;
>
> management be on the basis of multiple use and sustained yield;
>
> the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values;
>
> the United States receive fair market value of the use of the public lands and their resources; and
>
> the public lands be managed in a manner which recognizes the nation's need for domestic sources of minerals ...including implementation of the Mining and Materials Policy Act of 1970.

Most of these policy goals are not fulfilled by the existing mining law.

Retention of Federal Land in Public Ownership -- Under the Mining Law of 1872, a patent (fee simple title) may be obtained to federal land by the owner of a valid mining claim if the applicant demonstrates the discovery of a valuable mineral deposit and proves that at least $500 has been expended for the development of the claim. Although the percentage of claims that are actually patented is relatively small (over 6 million claims have been filed, of which 65,000 have been patented and converted to private ownership) the acreage is significant. During the past 117 years, the government has sold about 3.2 million acres of land (an area about the size of Connecticut) under the patent provision of the 1872 Mining Law.

Disposal of lands has continued since the passage of FLPMA with about 66,000 acres of land leaving federal ownership through mining law patents between 1978 and 1987. In addition, 84,000 acres have been patented for oil shale claims that were grandfathered under the mining law in 1920. The vast majority of these claims were patented in 1986

My proposal would eliminate the right to a surface patent and would substitute a patent to the minerals only. The mineral patent would revert to the federal government at the end of production.

Receipt of fair market value for the use of the public lands and their resources --

When lands are patented under the mining law the federal government receives either $5.00 an acre (for a lode claim) or $2.50 an acre (for a placer claim). The General Accounting Office recently issued a report on the 1872 Mining Law (Federal Land Management: The Mining Law of 1872 Needs Revision, GAO/RCED-89-72) which analyzed whether the federal government was obtaining a fair return for public lands disposed of. It should be no surprise to anyone that $5.00 an acre is often much less than fair market value. As some of the newspaper articles on the GAO report stated -- these are fast food hamburger prices! GAO provided several examples, including -- a 449 acre patent near Las Vegas, Nevada, appraised at over $2 million; a 34 acre patent near Sonora, California, appraised at over $500,000; and patented lands near Keystone, Colorado, which were for sale for $11,000 per acre.

Equally troubling is the fact that the federal government receives no return for the minerals extracted from the public lands subject to unpatented mining claims, or for the use of federal lands for mining purposes. The Department of the Interior, the agency charged with administering the mining laws, has no idea what the value of minerals taken from public lands might be. I have asked GAO to provide me with a figure and they have been unable to. The Forest Service estimated in testimony before the House Interior Committee Subcommittee on Mining and Natural Resources that the annual value of minerals extracted from national forest lands under the 1872 Mining Law was about $694 Million.

I would guess that the value of minerals taken from all public lands (Forest Service and BLM) is substantially higher. AN estimate by the Wilderness Society puts the value of public domain minerals sold each year -- with no revenue to the federal government -- at approximately $3.9 billion. According to the 1989 State Mineral Summaries published by the Bureau of Mines, the value of nonfuel minerals produced in Nevada in 1988 was $1.867 billion. Nevada is 85 percent federal land. Utah (63 percent federal land), produced $990 million worth of nonfuel minerals. Wyoming (49 percent federal land) produced $755 million in mineral value. The total value of minerals produced in the eleven public lands states (states west of the 100th meridian and Alaska) in 1988 was $12.3 billion.

Whether the amount is $700 million, $3.9 billion, or $12 billion, my point is that despite the fair market value policy set forth in FLPMA - with the exception of minimal filing fees - the federal government receives no direct return from the mining activities on its own land.

My bill would raise the existing filing fees to more adequately cover the costs of administering the law, would require annual holding fees or diligent development expenditures for exploration claims, surface use fees for patents and a royalty on production.

Land Use Planning, Multiple Use, and Protection of Other Values

The Mining Law of 1872 contains an implicit presumption that mineral development is the highest and best use of land. This presumption is no longer universally shared by the American people. The Mining Law operates independently of the land use planning process. This is in contrast to other activities on federal lands -- timber harvesting, grazing, oil and gas leasing, off-road vehicle use - which are explicitly dealt with in land use plans. When mining activity is initiated, it essentially becomes a dominant use on the land. Where mining activities are judged to be incompatible with other land uses or where retaining total federal ownership of a land area is essential, the land manager must formally withdraw lands from entry under the mining law.

The 1872 Mining Law does not provide for the protection of other values - environmental, archeological, etc. - on the public lands. Numerous other laws have been enacted in the past 25 years to protect environmental quality, endangered species and cultural resources. Many of these laws, including the National

Environmental Policy Act, apply to mining operations. In addition, both the Forest Service and the Bureau of Land Management have generic authority to minimize adverse environmental impacts on surface resources, including the authority to require reclamation and bonding. This authority should be strengthened through affirmative statutory language; bonding and reclamation should be required for all surface disturbing operations; and federal land management plans should be amended to address the conditions for conducting exploration and mining operations.

My bill would provide the necessary statutory authority and would require amendments to land and resource management plans to reflect the enactment of a new system for hardrock mining.

Recognizing The Nation's Need For Minerals/Fostering Private Enterprise

True to its 19th century intent of promoting the exploration and development of domestic mineral resources as well as the settlement of the western United States, this is one policy goal that the Mining Law was clearly intended to fulfill. The Mining Law operates through private initiative and private enterprise - the concept some have called "self-initiation." My bill would retain this concept.

However, there are many aspects of the law that do not effectively and efficiently promote mineral development. The unlimited duration of unpatented claims coupled with the lack of any true diligence requirement are an open invitation to abuse of the law. Mining claims are easily used for speculative purposes or nuisance value or as a cover for trespasses on the public land. These abuses conflict with and prevent legitimate mining operations. The uncertainty of tenure prior to a discovery of a valuable mineral and the subjective nature of the discovery test invite litigation. The law contains antiquated distinctions between placer and lode claims. There is confusion over whether certain minerals are locatable. In summary, there is a need to reform the 1872 Mining Law - to simplify it and to modernize it.

My bill would preserve self-initiation for prospecting, would provide for uniformity of claims, liberalize the discovery test and substitute true diligence requirements, promoting mining not speculation and abuse.

In developing my proposal to update the 1872 Mining Law, I have been guided by these modern land and resource management policies, including the desire to provide for efficient mineral development on public lands.

My bill is intended to provide a framework upon which to begin meaningful discussions of Mining Law reform. It is not a perfect bill, nor does it comprehensively address every issue that anyone ever thought should be included in a mining bill. It is intended to provoke suggestions, comments, and ideas. And I have no doubt that it will provoke criticism given the contentious history of past efforts to amend the Mining Law.

I look forward to hearing the testimony of the witnesses today. Thank you Mr. Chairman.

[From the Reno Gazette Journal, June 4, 1989]

MINER STRIKES IT RICH WITH YUCCA MOUNTAIN CLAIMS—TONOPAH MAN SETTLES WITH DOE FOR $249,500

(By Doug McMillan)

It's the dream of every prospector to find the mother lode, but one part-time Tonopah miner has struck it rich by mining the U.S. Department of Energy.

Anthony Perchetti, a contractor who has dabbled in central Nevada mining claims for years, has received $249,500 from the DOE for his mining claims on Yucca Mountain, proposed site for the nation's first high-level nuclear waste repository.

Perchetti staked 27 mining claims on the barren mountain at the eastern edge of the Nevada Test Site in 1985 and 1988, before the DOE embarked on a study there that scientists say will be the most exhaustive examination of a piece of ground in history.

The 1872 Mining Law gave Perchetti the right to stake and work his 540 acres of claims, but that would have raised havoc with the DOE's work, so the agency had to pay him to abandon them, Carl Gertz, head of DOE's Yucca Mountain Project, said.

"I was just a nuisance," Perchetti said.

But Perchetti, son of an early day Tonopah miner, claims he was genuinely interested in the mountain's mineral potential, not its value to the government as a possible burial ground for deadly radioactive waste.

The mountain, 12 miles northeast of Beatty, lies in a direct line with U.S. Nevada Gold Search's new gold mine, six miles from the site, and Bond Gold's Bullfrog mine, a massive new open pit gold mine, just west of Beatty, Perchetti said. It also has quartz and limestone outcroppings, a good indication of gold.

He also noted that 18 Nevada gold ore bodies have been found in welded tuff, volcanic ash, dust and rocks deposited from eruptions millions of years ago.

But Gertz said DOE geologists, from their preliminary assessments, think the mountain's mineral potential is probably nil. "There are no indications that there are any mineral values out there," he said.

"Unfortunately, because of the importance of the Yucca Mountain repository to the nation, it wouldn't have been possible to do an extensive drilling program to prove the value."

If Perchetti had tried to drill the mountain for core samples trying to confirm his hunches, he would have gotten in the way of the DOE's intensive "site characterization" studies. A legion of scientists are boring their own holes and shafts in the mountain to analyze every facet of the site to determine if deadly nuclear waste can be stored there safely for the next 10,000 years.

Thus the DOE had to negotiate with Perchetti to get him out of the way, Gertz said, confirming that the $249,500 settlement was paid in February.

Under the mining law, Perchetti had to pay only $500 to file his claims, but the Tonopah native estimates he spent about $20,000 to stake the claims and perform the assessment work the law requires to keep them valid.

That still gave him a tidy profit, he acknowledged, but "you always want more when you're dealing with the government. That was their offer. Of course, I wanted more."

Had the claims proved commercially valuable, he might have received a payment, plus millions in royalties from a mining company, he said.

LAND FROZEN TO MINERAL ENERGY

Just before settling with Perchetti, the DOE applied to the Bureau of Land Management to withdraw 4,300 acres of public land encircling the western end of the long, snake-like promontory. That froze the land to mineral entry, forestalling any other would-be prospectors from staking out more of the mountain.

Gertz said the DOE did not take action to withdraw the land sooner because Congress had not yet designated it as the sole site to be studied for the nuclear waste project. "Making a withdrawal earlier might have indicated a prejudgment on the Energy Department's part that Yucca Mountain should be the site," said Gertz.

Smaller portions of Yucca Mountain within the Test Site and Nellis Air Force Range were withdrawn from mineral entry years ago.

The DOE allowed Perchetti to cross the Test Site to do assessment work on his claims after he had staked them.

"Up to the time they applied to withdraw it, it was open to mineral entry," Perchetti said.

In 1986, when he filed his first batch of 10 claims, the land was part of Bullfrog County, the ill-fated and unique jurisdiction the 1987 Nevada Legislature set up to try to channel federal grants in lieu of taxes from the Yucca Mountain project into state coffers.

The 144-square-mile sham county had no residents, buildings or public agencies. Legislators designated Carson City, 270 miles away, as its county seat, and put it under the administration of former Gov. Richard Bryan, who had signed the bill creating it.

Federal mining law requires miners to file their claims with both the BLM and the county in which they are found, so Perchetti had to go to Carson City to file his 1986 claims.

"I had to file with the governor and lieutenant governor, and they accepted it," Perchetti said with a laugh. "There was no county recorder and clerk, so I had to go through them."

Legislators rescinded Bullfrog County this year after state courts ruled that a county with no residents could not have a representative government.

Had Perchetti been able to develop his claims, he might have become the sole proprietor and ruler of Bullfrog County.

"I was going to set up a camp and have some people working out there in a couple of trailers," he said. "Then Bullfrog County folded."

Conceivably, they could have elected themselves county commissioners, clerk, recorder and sheriff, and controlled up to $25 million in federal impact payments that some state officials estimated might accrue.

"That actually could have happened," Perchetti said, "but that wasn't my intention. I didn't do this because of Yucca Mountain."

Perchetti said he probably will plow what's left of his Yucca Mountain settlement, after paying a hefty tax bill to the IRS, into developing mining claims he holds in Tonopah, the ghost town of Belmont and at Eaton Creek, in southern Nye County.

Senator **Bingaman**. Senator Burns.

Senator **Burns**. Did you have a question? I will yield.

Senator **McClure**. I just want to say this. This is not a hearing on the GAO report, and I recognize that. GAO should be very thankful this is not a hearing on their report, because if I have ever seen a piece of garbage in my life, that is it. If there were anything like truth in packaging attached to government publications, they would go to jail for violation of that act.

I do not mean to be strident about it. [Laughter.]

Senator **McClure** [continuing]. But they do not tell the truth. The trouble is they do not know what the truth is; therefore, they cannot distinguish between fact and fancy.

Before we start quoting from the GAO report as to what facts are, I want to caution people there is an extensive rebuttal of the GAO report, the methodology which produced it and the limitations under which they operated, that led to totally erroneous conclusions. There is just no way to varnish the fact that the GAO report ought to be an embarrassment to intelligent men and women.

Now I recognize that some people find it useful to use it because it supports and bolsters conclusions which they may have formed before they read it or as they read it. But please do not take the GAO report as meaning anything other than a shoddy piece of work.

Senator **Bingaman**. Let me call on Senator Burns, and let me just point out that we are a half hour into this hearing and we have not heard from a witness yet. Whenever we could get to it, it would be good.

STATEMENT OF HON. CONRAD BURNS, U.S. SENATOR FROM MONTANA

Senator BURNS. Thank you, Mr. Chairman. I appreciate that, and I appreciate the Senator from Idaho. Why not really tell them what you think of the GAO report?

I appreciate the opportunity to comment for the record on the revision of the law which has been a mainstay of mineral development in this country for over a century. The Mining Law of 1872 provided an important incentive as far as development and the expansion to the west.

When you talk about a Mining Law, you are talking about my State of Montana. In fact, our motto is "Oro Y Plata", which means gold and silver. The Montana state seal carries the miner's pick and shovel, and I am proud of the heritage of my state and the legacy of those early miners whose courage and perseverance provided much of the needed resources for this country.

Towns such as Butte and Anaconda and Helena and Virginia City sprang up as a result of mining. Even the cattle industry had its roots in mining. Stockmen attracted by free grass first brought cattle and sheep to supply those mining camps. Of course, we know the free grass is gone.

Mining still plays a major role in the Montana economy, probably one of the bright and shining stars out there. They produce a range of minerals, including gold and silver, lead and zinc, copper. Montana mines, outside of Canada, the USSR and the Union of South Africa, producing palladium and chrome are all strategic materials used in our national defense programs.

Mineral extraction provides 3,600 jobs directly for Montana, and it is critical that it be continued for the prosperity of our state. We rank 17th nationally in the production of nonfuel minerals.

Since the passage of the Mining Law in 1872, Congress has consistently supported a strong domestic minerals industry. Over the years, we have supplemented the Mining Law to reflect our concerns for the environment and the need to use our resources wisely.

Mining on public lands must comply with the National Environmental Policy Act, and appropriate reclamation is required at this time.

We need balance in additional environmental restrictions with jobs and the realization that we may force our Nation into further dependence on foreign sources of strategic and critical minerals. I am extremely concerned about any changes which would substantially increase the cost of mineral exploration. I am afraid that too much credence may be placed on the March 1989 GAO report that our good Senator from Idaho was referring to calling for the revision in this law.

Let us not limit the search for minerals to the wealthy and large firms. Entrepreneurialship by the average citizen must continue to be encouraged. The mining industry in this country is driven by private initiative. We must be careful that government does not destroy the private sector initiative through ill-conceived changes in a basic law that has worked well for over 100 years.

Our country is rich in natural resources, but we must always be mindful of their wise use. Mineral resources are nonrenewable. They are difficult to find, and without large-scale exploration efforts our reserve base will soon dry up.

I strongly believe that Congress should continue to encourage a growing domestic mining industry and that any changes in the Mining Law should enhance, not detract, from that policy. The existing law not only serves the mining industry, but it also serves the public interest.

Thank you, Mr. Chairman. I would ask without objection that my comments be added as part of the record.

[The prepared statement of Senator Burns follows:]

Mining Law of 1872
Senate Energy and Natural Resources Committee
Subcommittee on Mineral Resources Development and Production
Statement by Senator Conrad Burns (R-MT)
June 7, 1989

Mr. Chairman. I appreciate the opportunity to comment for the record on the revision of a law which has been the mainstay of mineral development in this country for over a century. The Mining Law of 1872 initially provided an important incentive which sparked mineral development and the western expansion of this country.

When you talk about mining and the mining law, you're talking about Montana! Our state motto is "Oro Y Plata", the Spanish words for "gold and siver", and the Montana state seal includes a miner's pick and shovel. I am proud of the heritage of my state and the legacy of those early miners, whose courage and perservance provided much needed mineral resources. Towns in Montana such as Butte, Anaconda, Helena and Virginia City sprang up as a result of mining. Even the cattle industry's roots are tied to mining. Stockmen, attracted by free and abundant grass, first brought in cattle and sheep to supply the mining camp butcher shops.

Mining still plays a major role in Montana's economy, ranking third in the state. Montana mines produce a range of minerals including gold, silver, coal, lead, and zinc. Montana also has the only mines outside of Canada, the U.S.S.R. and the Union of South Africa producing platinum, palladium and chronium, all strategic minerals used in our national defense programs. Mineral extraction provides 3,600 jobs for Montanans and is critical to the continued prosperity of our state. Montana ranks 17th nationally in the production of nonfuel minerals.

Since passage of the Mining Law of 1872, Congress has consistently supported a strong domestic mineral industry. Over the years, we have supplemented the mining law to reflect our concern for the environment and the need to use our resources wisely. Mining on public lands must comply with the National Environmental Policy Act and appropriate reclamation is now required as well.

We need to balance additional environmental restrictions with jobs and the realization that we may force our nation into a further dependence on foreign sources of strategic and critical minerals. I am extremely concerned about any changes which would substantially increase the cost of mineral exploration. I am afraid that too much credence may be placed on the March 1989 GAO Report calling for the revision of the 1872 mining law. Let's not limit the search for minerals to the wealthy and large firms. Entrepreneurship, by the average citizen must continue to be encouraged. The mining industry in this country is driven by private initiative. We must be careful that government does not destroy that private sector initiative through ill-conceived changes in a basic law that has worked well for over 100 years.

Our country is rich in natural resources but we must always be mindful of their wise use. Mineral resources are nonrenewable and difficult to find, without large-scale exploration efforts our reserve base will dry up. I strongly believe that the Congress should continue to encourage a growing domestic mining industry and that any changes to the mining law should enhance, not detract from that policy.

The existing law not only serves the mining industry it also serves the public interest!

Senator **Bingaman**. Senator Murkowski.

STATEMENT OF HON. FRANK H. MURKOWSKI, U.S. SENATOR FROM ALASKA

Senator **Murkowski**. Thank you, Mr. Chairman.

As the ranking member of the subcommittee, I am very pleased to respond as another westerner. Obviously there is more than a casual concern here.

Mr. Chairman, approximately one-third or 720 million acres of the total land in our Nation is public land owned by the U.S., the vast majority of which lies in the western part of the United States as well as my State of Alaska. It is in these states where the most magnificent scenery—at least we think so—and the largest part of our mineral resources are located.

Consequently, we have the potential for conflict. Over two-thirds of these public lands have been withdrawn already from mineral development. This rather shocking withdrawal has occurred largely as a result of the Congress and the Executive Branch failing to consider the entire public land withdrawal picture when acting on specific land withdrawal proposals.

Consistently, proponents tout the merits of each individual withdrawal, and obviously they have merits on their own, and characterize an area as only a small part of the United States or a small part of the public land system.

These individual and modest withdrawals which our government has allowed to accumulate now make up two-thirds of the public lands now withdrawn from mining. There is a serious concern that too many wilderness areas and other land withdrawals have been established without adequate regard for their mineral potential, and Federal agencies have severely restricted the industry from examining the mineral prospects in those areas.

We can make matters worse by recognizing that some wilderness areas have even been established specifically to prevent known mineral potential from being developed. Mr. Chairman, I will have some notes for the record with regard to some specifics on that.

Mineral development in this country has suffered from a deliberate shift in public land policy from multiple use to basically no use. Let us not kid ourselves. This no use land policy implemented on an incremental basis and ostensibly in the public interest has hampered our ability to compete abroad, contributed certainly to our trade deficit, and caused this Nation to become dangerously dependent on foreign sources for our critical strategic mineral needs.

Antimony is an example. Nearly 65 percent of our consumption must be imported. We rely on 33 percent of antimony coming in from China and on 22 percent from South Africa.

Similarly, we are dependent on foreign sources for 100 percent of our manganese. Of this, 27 percent comes from South Africa.

Mr. Chairman, as a member of the Foreign Relations Committee I observe the process of inconsistency where we simply said, well, yes, sanctions are in order on the apartheid issue; the morality is absolutely a question that we have to take a stand on. But then we went around and simply excused ourselves from sanctions on strategic minerals that we needed from South Africa. Now what kind of moral judgment is that? We simply say, well, we will just sanction everything else but we will exempt what is in our own self-interest. That is exactly what we did.

Mineral development in this country has, as I said, suffered from a multiple use where it started which was restricted to a no use. Since late 1986 and thereabout, the Commerce Department has been monitoring imports of strategic and critical minerals from Communist nations. Its findings are rather alarming.

In 1987, for example, the U.S. obtained from the Soviet Union and the East Bloc 19 percent of U.S. platinum group metals, 13 percent of chrome needs, and 13 percent of silicone manganese. These figures represent not only a significant portion of U.S. requirements but also a large increase from previous import levels.

Our dependence on foreign sources for critical minerals is directly related to our public land policies and our overregulation of the mining industry. The thirst for public land withdrawals and our overregulation of the mining industry, the thirst for public land withdrawals and environmental regulations which are incrementally piled one on top of the other without regards for our Nation's mineral security in the national interest is drying up our domestic minerals industry.

It is against this backdrop that we hold a hearing on mining law reform here today. We cannot afford to take a similarly narrow view of mining law reform. This committee's consideration of mining law reform must go well beyond a discussion of difficulties or abuses in the administration of a well-developed and dynamic 1872 mineral law. The impact of any reform proposal in our domestic minerals industry and our Nation's mineral security must be considered.

Finally, in the case for legislative reform which must be made before we undo a system that has been carefully refined for more than 100 years of application and around which many other Federal and State regulatory proposals have been built, not to mention the investment of private individuals, we must be absolutely certain of a need for reform and what its impact will be on our mining industry.

In my view, any consideration of mining law reform must include looking for ways to revitalize our domestic mineral industry by providing increased exploration and development incentives. In this regard, the single most important action we can take to reduce U.S. dependence on insecure imports of minerals would be to reform the process by which access is granted to Federal lands for mineral exploration.

Mr. Chairman, at present vast areas of these lands have been closed to exploration and development because of restrictive land use policies. These policies pay no regard to the potential strategic importance of the minerals that might be found. Present concerns about the performance of the 1872 Mining Law and the 25th anniversary of the Wilderness Act should cause us to take a second look at the mineral potential lost now that over 88 million acres of wilderness has been closed to mining.

Incentives and access for mineral exploration to the public lands goes to the very heart of the 1872 Mining Law. Any further consideration of mining law reform by this subcommittee should include hearings and a comprehensive analysis of the history of public land withdrawals and assessment of the mineral development opportunities foreclosed as a result of such withdrawals and the disincentives created by the current regulatory framework within which mineral development must take place.

We have 56 million acres of wilderness in our state of 360 million acres in total. We have basically three mines. It took congressional action to allow the three mines that we have in an operational mode, the Greens Creek on Admiralty Island which is in the wilderness; the Red Dog in the Katsagu area where we had to take congressional action to actually bring about a land exchange; and the Quartz Hill prospect, which is the largest molybdenum deposit known to exist in North America and in the middle of a wilderness area.

To give you some idea, Mr. Chairman, that there are no vast areas of public land available for mining exploration anymore. They have been curtailed by legislative action, and I think it is time that this committee recognized that we have reduced our mineral industry in this country almost to the point of it being nonexistent. The only new areas that can be opened up can only be opened up with congressional action. Let us recognize that, Mr. Chairman.

I have some material for the record which I would ask be entered indicating the strategic minerals that we use and the amount of imports that we bring in and the proven reserves of those strategic minerals, particularly in the western states and the State of Alaska, virtually none of which are being developed because of Federal restrictions.

Thank you, Mr. Chairman.

[The prepared statement of Senator Murkowski and additional material follow:]

SENATOR FRANK H. MURKOWSKI

STATEMENT CONCERNING MINING LAW REFORM

JUNE 7, 1989

Mr. Chairman, approximately one-third, 720 million acres, of the total land in our nation is owned by the United States, the vast majority of which lies in the western states and Alaska. It is in those same states where our most magnificent scenery and the largest part of our mineral resources are concentrated.

Over two-thirds of these public lands have been withdrawn or restricted from mineral development. This shocking withdrawal has occured largely as a result of Congress and Executive failing to consider the entire public land withdrawal picture when acting on specific land withdrawal proposals.

Consistently, proponents tout the merits of each withdrawal proposal and characterize an area as only a small part of the United States, or of the public land system, or of the public lands within a particular state. But these individual modest withdrawals which our government has allowed to accumulate make up the two-thirds of public lands now withdrawn from mining.

A serious concern is the fact that too many wilderness areas and other land withdrawals have been established without adequate regard for their mineral potential and federal agencies have severely restricted the industry from examining the mineral prospects in those areas. To make matters worse, some wilderness areas have even been established specifically to prevent known mineral potential from being developed.

Mineral development in this country has suffered from the deliberate shift in public land policy from "multiple use" to "no use". This "no use" land policy, implemented on an incremental basis and ostensibly in the public interest, has hampered our ability to compete abroad, contributed to our trade deficit, and caused this Nation to become dangerously dependent on foreign sources for our critical strategic minerals needs.

Antimony is an excellent example. Nearly 65% of our consumption must be imported. We must rely on China for 33% of our imports and on South Africa for 22%. Similarly, we are dependent on foreign sources for 100% of our manganese. Of this, 27% comes from South Africa.

Since late 1986, the Commerce Department has been monitoring imports of strategic and critical minerals from communist nations. It's findings are particularly alarming. In 1987, for example, the U.S. obtained from the Soviet Union and it's East bloc allies 18.7% of U.S. platinum group metals needs, 13.4% of chrome needs, and 13% of silicomanganese (a critical mineral in aluminum and steel production) needs. These figures represent not only a significant proportion of U.S. requirements, but also a large increase from previous import levels.

Our dependence on foreign sources for critical minerals is directly related to our public land policies and our over regulation of the mining industry. Thirst for public land withdrawals and environmental regulations, which are incrementally piled one on top the other without regard to our Nation's mineral security, is drying up our domestic minerals industry. It is against this backdrop that we hold a hearing on mining law reform here today.

We cannot afford to take a similarly narrow view of mining law reform This Committee's consideration of mining law reform must go well beyond a discussion of difficulties or abuses in the administration of the well developed and dynamic 1872 Mining Law -- the overall impact of any reform proposal on our domestic minerals industry and our Nation's mineral security must be considered.

And a case for legislative reform must be made. Before we undo a system that has been carefully refined over more than 100 years of application and around which many other federal and state regulatory schemes have been built -- not to mention the investments of private individuals -- we must be absolutely certain of the need for reform and it's potential impact.

In my view, any consideration of mining law reform must include looking for ways to revitalize our minerals industry by providing increased exploration and development incentives. In this regard, the single most important action we can take to reduce U.S. dependence on insecure imports of minerals would be to reform the process by which access is granted to federal lands for mineral exploration. At present, vast areas of these lands have been closed to exploration and development because of restrictive land-use policies. These policies pay no regard to the potential strategic importance of the minerals that might be found.

Present concern about the performance of the 1872 mining law and the 25th anniversary of the Wilderness Act should cause us to take a second look at the mineral potential lost now that over 88 million acres of wilderness have been closed to mining. Incentives and access for mineral exploration on the public lands goes to the very heart of the 1872 mining law. Any further consideration of mining law reform by this subcommittee should include hearings and a comprehensive analysis of the history of public land withdrawals, an assessment of the mineral development opportunities foreclosed as a result of such withdrawals, and the disincentives created by the current regulatory framework within which mineral development must take place.

MEMORANDUM

OFFICE OF SENATOR FRANK H. MURKOWSKI

RE: CRITICAL MINERALS

--Per section 303(a)(2) of the Comprehensive Anti-Apartheid Act of 1986, following are certified as strategic minerals essential for economy or defense of US and unavailable from reliable and secure suppliers:

--Direct economic costs to US resulting from embargo of South African strategic/critical minerals estimated at $1.85 billion/per yr (Bureau Mines study). 94% of these costs are for platinum-group metals (PGMs).

--If embargo, dependence on USSR estimated to increase substantially.

--ANDALUSITE

* 100% net import reliance. 100% from South Africa.

* No known US reserves.

--ANTIMONY

* 65% net import reliance. Imports for consumption increased considerably in 1988. China major supplier @ 33% of imports, 22% from South Africa.

* Domestic reserve base estimated @ 100,000/short tons antimony content. Supplies less than half of demand.

* Deposit of interest near Norton Sound, Alaska.

--ASBESTOS, CHRYSOTILE

* 78% dependence on imports. Majority of imports from Canada, 6% from South Africa.

* Domestic resources 8 million tons of 200 total identified world resource. Asbestos-related health risks major issue affecting domestic industry, significant decrease in domestic industry again 1988.

* Deposit of interest near Can/US border on Yukon Rvr., Alaska

--CHROMIUM

* 75% dependence on imports. 61% from South Africa (99% of total world resource is in South Africa).

* U.S. consumption increased 30% in 1988, reflecting growth in steel industry.

* If embargo, trade pattern adjustment would occur, exports to US would continue uninterrupted. Supply from Finland, Phillippines, Turkey, Brazil. Embargo would result in premium prices, average annual cost to US consumers would be $30 mil.

* Domestic chromite mining on regular basis stopped in 1961. U.S. resources total 25.4 million metric tons (est. 5.14 million metric tons @ Red Mountain, AK)

--COBALT

* 84% dependence on imports. 36% from Zaire and 19% from Zambia. Both countries rely on South African transportation systems for export.

* Embargo would necessitate rerouting of Zairian cobalt. Initially, cobalt would have to be flown out. Average annual cost to US consumber would be $4 mil.

* Domestic mine production ceased in 1971. U.S. supplies 19% of domestic consumption thru recycling.

* Deposits of interest @ Bornite, Kuskokwim, Rainbow Mountain, MacClaren, and Brady Mountain areas, Alaska.

--DIAMONDS, INDUSTRIAL

* 90% dependence on imports. 38% natural stones from South Africa

* Domestic resources are unknown. Exploration continues in Alaska, Michigan, Minnesota, Wisconsin, Colorado and Wyoming.

*Potential deposits @ Circle area, Alaska.

--MANGANESE

* 100% dependence on imports. 27% from South Africa. USSR and South Africa account for more than 80% of identified world resources.

* Sufficient alternative world manganese mining/processing capacity to offset embargo, Australia, Brazil, Gabon. Embargo would result in premium paid, average annual cost to US would be $31 mil.

* US import levels 1988 highest in decade. Domestic resources exist but cost of developing them is 2-18 times market price.

* Deposit of interest on Chenega Island near Seward, Alaska.

--PLATINUM GROUP METALS or PGMs (Platinum, palladium, iridium, osmium, rhodium and ruthenium)

- * 93% dependence on imports. 44% from South Africa. 90% of estimated world PGM reserve base in South Africa.
- * Significant alternative supply sources in Soviet bloc/Canada. Major shortages would result from embargo, average annual cost to US consumer would be $1.35 bil.
- * Domestic resources estimated @ 300 million ounces of 3.3 billion world resource. Stillwater Mine, MT only US producer. If embargo, could satisfy 2.5% of annual domestic consumption.
- * Deposits of interest in Kuskokwim, Rainbow Mountain, Tonsina, MacClaren, Goodnews Bay, Brady Glacier and Halibut Bay, Alaska.

--RUTILE

- * 250,000 tons imported of 370,000 tons consumed in US 1988. 17% of US consumption from South Africa.
- * Sufficient alternative supplies, Australia, Canada, Sierra Leone. If embargo, average annual cost to US consumers would be $32 mil.
- * Domestic reserve base estimated @ 1,600/thousand short tons of concentrate.
- * No known reserves in Alaska.

--VANADIUM

- * 4,841,000 pounds imported of 9,678,000 pounds consumed in US 1988. 53% from South Africa.
- * Estimated that domestic resources adequate to supply current domestic needs, substantial part of US demand met by imports because of price advantages.
- * Recovery of vanadium as byproduct of uranium production now uneconomical. Vanadium byproduct of refining Venezuelan crude oil, supplied 40% of domestic consumption 1984-86. Finland, China also alternative sources. If embargo, average annual cost to US consumer $7 mil.
- * Petroleum industry 120% increase in vanadium purchases over 1987 plus increases in all steel consuming sectors created shortage.

* No known reserves in Alaska.

ALASKA MINERAL PROJECTS

CURRENT PROJECTS:

- GREENS CREEK:
  - SE ALASKA/ADMIRALTY ISLAND
  - JV-BP MINERALS/HECLA MINING
  - UNDERGROUND MINE, SILER/ZINC/LEAD
  - 210 DIRECT JOBS
  - $115 MILLION CAPITAL INVESTMENT
  - 10 YEAR LIFE @ CURRENT KNOWN RESERVES
  - PRODUCTION TO BEGIN JUNE/JULY 1989
- RED DOG:
  - NW ALASKA/KOTZEBUE
  - JV-NANA REGIONAL CORP/COMINCO
  - OPEN PIT MINE, ZINC/LEAD
  - 350-400 DIRECT JOBS
  - $350 MILLION CAPITAL INVESTMENT
  - 50 YEAR LIFE @ CURRENT KNOWN RESERVES
  - PRODUCTION TO BEGIN JANUARY 1990
- BIMA OFFSHORE GOLD DREDGE:
  - NW ALASKA/NOME, NORTON SOUND
  - WESTGOLD, INC.
  - OFFSHORE PLACER DREDGE, GOLD
  - 100 DIRECT JOBS
  - $45 MILLION CAPITAL INVESTMENT
  - UNKNOWN LIFE EXPECTANCY @ CURRENT KNOWN RESERVES
  - 1987 PRODUCTION @ 36,000 OUNCES. ANTICIPATE SAME IN 1988

FUTURE PROJECTS

- QUARTZ HILL:
  - SE ALASKA/KETCHIKAN
  - US BORAX CORP.
  - OPEN PIT MINE, MOLYBDENUM
  - 1,000 DIRECT JOBS
  - $1.1 BILLION CAPITAL INVESTMENT
  - 55 YEAR LIFE EXPENCTANCY @ CURRENT KNOWN RESERVES
  - UNKNOWN WHEN WILL BEGIN PRODUCING, SUBJECT TO ENVIRONMENTAL CONCERNS AND MARKET PRICE

- RED MOUNTAIN:
  - SOUTHCENTRAL ALASKA/KENAI PENNINSULA, SELDOVIA
  - COOK INLET REGIONAL CORP
  - OPEN PIT MINE, CHROMIUM
  - 200 DIRECT JOBS
  - $30-40 MILLION ESTIMATED CAPITAL INVESTMENT
  - 25 YEAR LIFE EXPECTANCY @ CURRENT KNOWN RESERVES (5.14 MILLION METRIC TONS
  - UNKNOWN WHEN WILL BEGIN PRODUCING

- AJ GOLD MINE:
  - SE ALASKA/DOWNTOWN JUNEAU
  - ECHO BAY MINES CO.
  - RE-OPENING LODE GOLD MINE
  - 200-225 DIRECT JOBS
  - $150-175 MILLION CAPITAL INVESTMENT
  - 12-20 YEARS LIFE EXPECTANCY @ CURRENT KNOWN RESERVES
  - ESTIMATE ANNUAL PRODUCTION 7 MILLION TONS ORE/250,000 OZ GOLD.

- KENSINGTON GOLD MINE:
  - SE ALASKA/JUNEAU
  - ECHO BAY MINES CO.
  - RE-OPENING LODE GOLD MINE
  - 100-125 DIRECT JOBS
  - $80-100 MILLION CAPITAL INVESTMENT
  - 15-20 YEAR LIFE EXPECTANCY @ CURRENT KNOWN RESERVES
  - ESTIMATED 1 MILLION TONS ORE/135,000 OZ GOLD.

OTHER UNDEVELOPED MINERAL POTENTIAL IN ALASKA

* ASBESTOS: 55 MILLION TON PROVEN RESERVES NEAR YUKON RIVER AND THE KOBUK AREA

* FLUORINE: 5 MILLION TON PROVEN RESERVE IN LOST RIVER AREA

* NICKEL: 1.1 BILLION POUNDS PROVEN RESERVES IN BRADY GLACIER, YAKOBI ISLAND, MIRROR HARBOR AND SPIRIT MOUNTAIN AREA

* ANTIMONY: 11 MILLION POUNDS PROVEN RESERVES NEAR FAIRBANKS, KANTISHNA, NOME, TOK AND RED DEVIL AREAS.

* COBALT: 65 MILLION POUNDS IN KUSKOKWIM, BORNITE, RAINBOW MOUNTAIN, MACCLAREN AND BRADY GLACIER AREAS

* PLATINUM-GROUP METALS: 600,000 OUNCES IN KUSKOKWIM, RAINBOW MOUNTAIN, HALIBUT BAY, AND BRADY GLACIER AREAS)

* PLUS DEPOSITS OF COPPER, TANTALUM, COLUMBIUM, URANIUM, TUNGSTEN, ZIRCONIUM, RARE-EARTH ELEMENTS, MERCURY, ETC.

Senator **Bingaman**. Thank you very much.

Our first witness is the Honorable Larry Craig, Congressman from Idaho, who is the ranking member of the Mining Subcommittee of the Interior Committee in the House of Representatives. We are very pleased to have you here and look forward to your testimony.

Go right ahead.

STATEMENT OF HON. LARRY E. CRAIG, U.S. REPRESENTATIVE FROM IDAHO

Mr. **Craig**. Thank you very much, Mr. Chairman, Senator Bumpers, Senator Murkowski, my senior Senator McClure.

I appreciate an opportunity to come before your committee today to discuss the legislation and the concept around the 1872 Mining Law and what it currently does for primarily those public land states west of the Mississippi.

I would also like for the record to clarify what I think was probably a slip in information. When Senator Bumpers referred to 160,000 acres of land patented last year, I believe that was 16,000 as by the current record of the BLM.

Also something else that I think is very important to understand when we talk about the magnitude of land patented, a reference to a single state or the land surface of the single state as being the magnitude. I would only suggest that in the concept of western space, a state the size of Connecticut is the size of the largest county in my congressional district.

We in the west tend not to look at those sizes as relatively significant in the whole of the public land mass of the western United States. Certainly Senator Murkowski and the masses of spread of public land that he refers to in his state I think makes reference to the fact that Connecticut might not be found or might at least be mistaken for a lake or some other type of land mass in the State of Alaska.

What is currently going on in the western states in the significance of the renaissance of mining is extremely valuable for all of us, I think, to understand, Mr. Chairman. I say so, and I will move away from my full text for a matter of time and would ask that it be submitted to the record.

What I think is important in a state like Idaho that is a mining state historically and currently today is to look beyond that to what is going on in my neighboring State of Nevada which is in its sense a renaissance.

For any member of the United States Congress to have that kind of economic activity going on in their state today, they would proclaim it without question as being a phenomenal success story. Let me tell you about it. I think it is valuable for the record.

The U.S. Bureau of Mines estimates that the value of Nevada mineral production amounted to $940 million in 1986. The Nevada Department of Minerals estimated that mineral exploration expenditures in the state amounted to $76 million during 1986 with more than $296 million spent on purchases by mining operators.

During that same year, the mineral industry paid $21 million in direct State and local taxes, with an additional $4 million paid by employees in State taxes and property taxes. Nevada has no State income tax. Now remember, this is an industry that does not pay royalty.

Direct salaries paid to mining employees approximated $195 million, and the mining industry contributed to an increase in statewide employment by nearly 17,000 jobs. In a state like Nevada or Idaho or Alaska or even New Mexico, that is a phenomenal base of employment; new jobs in that period of time.

Many of the citizens of my state have gone south to Nevada to find work in the growing mining industry there either in a direct or indirect way, Mr. Chairman. So what was once believed to be a dying industry in the west now because of new technology is a renaissance industry employing thousands and continuing to provide that kind of employment opportunity in the foreseeable future.

It is important for us to understand that. This economic success story has been played out time and time again in the west as mining has changed with the economies of this Nation and certainly with the technologies that are available.

Public policy framework that has allowed this economic good news to come about is the Mining Law. We ought not question that. The 1872 Mining Law, as I think was properly described by my senior Senator, is as alive and vital and new and dynamic today as the day that it was created. Many people try to portray this law as antiquated and desperately in need of change. It is being characterized as a land giveaway that gives nothing back to the Nation or as a law that promotes environmentally unsound practices. This simply is not the case. In my opinion, there is no record to bear up those arguments.

The economic growth that I just described has aided in making this country economically strong and has contributed to one of the lowest rates of unemployment in several decades.

As to the simplicity of developing claims or patenting land, I can only say that the rhetoric that is being used is completely inconsistent with the reality.

Mr. Chairman, what I would like to do at the close of my statement is to show you a diagram that I think is not only visual in its value but is symbolic in what actually happens from the time the miner or the prospector's pick touches the outcropping and a determination might be made by that individual that there may be a mineral of value and, therefore, a reason to stake a claim and move through the process. I would like to show you that in a diagrammed flow chart way that I think is extremely valuable.

Mr. Chairman, the Mining Law is being portrayed as an ancient law that is not functioning. I believe nothing could be further from the truth.

I think what is true, though, Mr. Chairman, is that there are some interest groups in this country that do not have control over mining and access to public lands under the Mining Law that they would like to have.

Now they have control over the forest products industry. They have control over access to utilization of all other resources on public lands in determining whether they may or may not be developed for a variety of reasons. But once there is valid discovery with mining or with minerals, then a process must be followed but mining cannot be denied. Of course, that is a tremendous bugaboo to some interest groups today.

The only problem if you try to change it is that minerals and metals are where you find them. They do not comfortably come in areas that the Federal Government might hold out for lease purposes or to say have no other conflicts, therefore you can explore. Of course, that has been the direction of the Mining Law throughout history. That is the value of self-initiation, and that is what has made it so uniquely strong today.

I use Nevada as an example. I would like to go one step further in talking about Nevada and the tremendous gold discoveries that are going on there today in what is known as the Carlin Trend.

Because of technology, because of the ability to find today and to refine, that is not just a gold discovery. It may be the greatest gold discovery of all time. It may even rival the production of South Africa within time.

Mr. Chairman, if 20 years ago I had been here advocating that that area be put in wilderness and you had asked me the question is there any known or valuably known mineralization of that area that would preclude us from including it in the wilderness area, if I were representing the Bureau of Mines or the U.S. Geological Survey I would have had to honestly say no, Mr. Chairman, I do not believe there is that kind of mineralization.

Today, millions of dollars, thousands of jobs, millions of dollars in taxes and product is a result of technology and change, and that is the reality of a dynamic force known as the mining industry in this country today.

Senator Murkowski has talked about his state with 87 percent of it being owned and managed by the Federal Government; my state of Idaho with 62 percent, Nevada with 85 percent, New Mexico with 28 percent, Wyoming with 49 percent. Let me cite these percentages of public domain, and I cite them for the reason that in the four eastern states in which the Mining Law operates—Arkansas with 3 percent, Florida with 1 percent, Louisiana with .1 percent, and Mississippi with .01 percent publicly owned lands—it seems to be crystal clear to me, Mr. Chairman, that the lands that are being affected here are in the west. It is also clear that we are talking about the majority of land base of these states and the ability to control them.

I submit that if the legislators from eastern states who are so anxious oftentimes to change the Mining Law represented states that were as heavily publicly owned as are the western states and stood to lose as much as the western states could lose by changes in the Mining Law, they might not be so anxious to make sweeping change in this most important law.

Mr. Chairman, now for the sake of time I would like to ask two of my aides to come forward, and I would like to show you a flow chart as I depicted earlier in my testimony that I think is very valuable for all of us to understand.

Why not come right in front of the table and pull it forward.

It is 15 feet long, and you might need to use a magnifying glass to see every step of the road.

What does this represent, Mr. Chairman? From your left, my right, it represents from the time the miner's pick discovers what he believes might be a valuable find and decides to stake a claim every step that law requires from the 1872 law through FLPMA and all of the environmental concerns that are fully and necessarily applicable today in the process of moving through to patent.

This gives you an idea that it is not in fact a simplistic law today, nor is it a simplistic process. It is highly complicated. It is intended to be complicated. I think those of us who advocate leaving the 1872 law as it is certainly advocate that it proceed in an environmentally sound way.

I thought this was valuable for you to see and get a feel for. How many steps are there in the process?

VOICE. Too many.

Mr. CRAIG. The reaction is that there are literally hundreds. Now this represents every time a decision must be made in existing law to remain within the law to be able to qualify with BLM for a patent. Even then, if a valuable resource is not discovered there are necessary reclamation steps that would be required to leave the land whole in the end.

Thank you very much.

[The prepared statement of Mr. Craig follows:]

STATEMENT
OF
CONGRESSMAN LARRY E. CRAIG
BEFORE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION

MR. CHAIRMAN, I APPRECIATE THE OPPORTUNITY TO TESTIFY BEFORE THE SENATE SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION ON REFORMS TO THE 1872 MINING LAW . IT IS MY CONCERN THAT THE PURPOSES EXPLICIT IN THE SUBCOMMITTEE'S TITLE, MINERAL DEVELOPMENT AND MINERAL PRODUCTION, WOULD NOT BE WELL SERVED BY SWEEPING CHANGES IN THE CURRENT MINING LAW. AS VICE CHAIRMAN OF THE HOUSE SUBCOMMITTEE ON MINING AND NATURAL RESOURCES, I THOUGHT IT IMPORTANT THAT I SPEAK TO THIS ISSUE.

PRODUCTION OF MINERALS FROM THE PUBLIC LANDS IS IN THE MIDST OF A RENAISSANCE. FOR INSTANCE, IN THE STATE OF NEVADA WHERE 85 PERCENT OF THE STATE IS IN PUBLIC OWNERSHIP, MINERAL PRODUCTION IS AT A LEVEL NOT SEEN IN MANY YEARS, IF EVER. THIS SURGE IN MINING, MAINLY FOR GOLD, HAS HELPED TO FUEL A THRIVING ECONOMY.

THE U.S. BUREAU OF MINES ESTIMATES THE VALUE OF NEVADA MINERAL PRODUCTION AMOUNTED TO $304 MILLION IN 1986. THE NEVADA DEPARTMENT OF MINERALS ESTIMATES THAT MINERAL EXPLORATION EXPENDITURES IN THAT STATE AMOUNTED TO $76 MILLION DURING 1986 WHILE MORE THAN $296 MILLION WAS SPENT ON PURCHASES BY MINING OPERATORS. DURING THAT SAME YEAR, THE MINERAL INDUSTRY PAID $21

MILLION IN DIRECT STATE AND LOCAL TAXES, WITH AN ADDITIONAL $4 MILLION PAID BY EMPLOYEES IN STATE SALES TAXES AND PROPERTY TAXES. NEVADA HAS NO STATE INCOME TAX. DIRECT SALARIES PAID TO MINING EMPLOYEES APPROXIMATED $195 MILLION, AND THE MINING INDUSTRY CONTRIBUTED TO AN INCREASE IN STATEWIDE EMPLOYMENT OF NEARLY 17,000 JOBS.

MR. CHAIRMAN, THIS ECONOMIC SUCCESS STORY HAS BEEN PLAYED OUT TIME AND AGAIN IN THE WEST AS MINING HAS MOVED FORWARD AS A VIABLE AND GROWING PART OF STATE ECONOMIES. THE PUBLIC POLICY FRAMEWORK THAT HAS ALLOWED THIS ECONOMIC GOOD NEWS TO COME ABOUT IS THE MINING LAW. THE BASIS FOR MINING LAW IN THIS COUNTRY IS THE MINING LAW OF 1872. MANY PEOPLE TRY TO PORTRAY THIS LAW AS ANTIQUATED AND DESPERATELY IN NEED OF CHANGE. IT IS BEING CHARACTERIZED AS A LAND GIVE AWAY THAT GIVES NOTHING BACK TO THE NATION. THIS IS SIMPLY NOT THE CASE.

THE ECONOMIC GROWTH THAT I JUST DESCRIBED HAS AIDED IN MAKING THIS COUNTRY ECONOMICALLY STRONG AND HAS CONTRIBUTED TO ONE OF THE LOWEST RATES OF UNEMPLOYMENT IN SEVERAL DECADES. AS TO THE SIMPLICITY OF DEVELOPING CLAIMS OR PATENTING LANDS, I CAN ONLY SAY THAT THE RHETORIC THAT IS BEING USED IS COMPLETELY INCONSISTENT WITH THE REALITY OF THE SITUATION.

I HAVE WITH ME A 15 FOOT LONG FLOW CHART THAT OUTLINES THE PROCEDURES NECESSARY TO DEVELOP A PROSPECT UNDER THE MINING LAW. IT IS A THOROUGH AND THOUGHTFUL PROCESS--IT IS NOT A MATTER OF GETTING TO THE LAND OFFICE TO GRAB A PIECE OF FEDERAL LAND. MR. CHAIRMAN, THE MINING LAW IS BEING PORTRAYED AS AN ANCIENT LAW THAT IS NOT FUNCTIONING--NOTHING COULD BE FURTHER FROM THE TRUTH. WHAT IS TRUE, MR. CHAIRMAN, IS SOME INTEREST GROUPS IN THIS COUNTRY DO NOT HAVE THE CONTROL OVER MINING AND ACCESS TO PUBLIC LANDS UNDER THE LAW THAT THEY WOULD LIKE. THEY NOW SEEK TO CHANGE THE LAW TO GAIN THAT CONTROL.

WHAT IS BEING DISCUSSED HERE TODAY IS THE LIVELIHOOD OF THE WEST AND THE STRENGTH OF A NATION. THE MINING LAW APPLIES TO THE PUBLIC DOMAIN LANDS IN 19 STATES ALL BUT FOUR OF WHICH ARE WESTERN STATES.

FIRST LET ME CITE SOME PERCENTAGES OF PUBLIC DOMAIN LAND IN THE WEST: ALASKA, 87%; IDAHO, 62%; NEVADA, 85%; NEW MEXICO, 28% AND WYOMING, 49% SECONDLY, LET ME CITE THE PERCENTAGES OF PUBLIC DOMAIN LANDS IN THE FOUR EASTERN STATES IN WHICH THE MINING LAW OPERATES: ARKANSAS, 3%; FLORIDA, 1%; LOUISIANA, 1/10 OF A PERCENT; AND MISSISSIPPI, 1/100 OF A PERCENT. IT SEEMS CRYSTAL CLEAR TO ME THAT THE LANDS THAT ARE AFFECTED HERE ARE IN THE

WEST. IT IS ALSO CLEAR THAT WE ARE TALKING ABOUT THE MAJORITY OF THE LAND BASE WITHIN THESE STATES.

I SUBMIT THAT IF THE LEGISLATORS FROM EASTERN STATES WHO ARE SO ANXIOUS TO CHANGE THE MINING LAW REPRESENTED STATES THAT WERE AS HEAVILY PUBLICLY OWNED AS ARE THE WESTERN STATES, AND STOOD TO LOSE AS MUCH AS THE WESTERN STATES COULD LOSE BY CHANGES IN THE MINING LAW, THEY MIGHT NOT BE SO ANXIOUS TO MAKE SWEEPING CHANGES TO A PROCESS THAT IS FUNCTIONING SO WELL.

A LEASING BILL WILL NOT SERVE THE WEST NOR MINERAL PRODUCTION IN THE UNITED STATES WELL. THE HISTORY OF LEASING LAWS DOES NOT INDICATE THAT LEASING IS AN EFFECTIVE METHOD OF PRODUCING MINERAL RESOURCES FROM THE PUBLIC LANDS. COAL, AND ONSHORE OIL AND GAS PRODUCTION HAS LAGGED BADLY UNDER A LEASING SYSTEM. WE HAVE

CONTINUALLY SEEN OUR ENERGY DEPENDANCE ON FOREIGN SOURCES RISE TO NEARLY 50% OF OUR NEEDS. GRANTED, THIS IS NOT TOTALLY DUE TO AN INEFFECTIVE ENERGY PRODUCTION SYSTEM FROM THE PUBLIC LANDS. BUT THE LEASING SYSTEM WITH ITS ATTENDANT RED TAPE HAS NOT AIDED OUR CAUSE.

WE DO NOT NEED TO DO THE SAME TO HARDROCK MINERAL AND METAL PRODUCTION IN THIS COUNTRY AS HAS BEEN DONE TO THE ENERGY INDUSTRY. I STRONGLY BELIEVE THAT THE MINING LAW IS CURRENTLY FUNCTIONING IN THIS COUNTRY'S BEST INTEREST. TO MAKE BROAD CHANGES WOULD ONLY WEAKEN DOMESTIC PRODUCTION AND PUT THIS NATION FURTHER INTO DEBT. WE MUST NOT LET THIS HAPPEN.

AT THIS POINT I WOULD LIKE TO CITE THE TIMELESS AMERICAN PROVERB---"IF IT AIN'T BROKE DON'T FIX IT." AND TO ADVISE MY COLLEAGUES THAT SOME TIME THE "BREAKIN'S" IN THE "FIXIN."

THANK YOU.

Senator MURKOWSKI. I wonder, Mr. Chairman, if you would have any objection to having the audience see that, because it is an extraordinary display of detail in itself without saying what it is.

Mr. CRAIG. Mr. Chairman, we had to get a special run of paper from Boise-Cascade to get it printed.

Senator MURKOWSKI. Can you fold it out so they can see it? Lift it up higher.

Mr. CRAIG. Mr. Chairman, the reason for this is obvious. It is true, it is real, and I think it is phenomenally graphic of the fact that the 1872 Mining Law is alive and well.

As my senior Senator said, it must by its very nature cause people to comply with all existing public land laws as it relates to moving toward patent. It is not a process that is easy, and I would tell you that there may be those who would stake claims even though there is question as to whether there is valuable mineral.

But to gain title to the land is a phenomenally lengthy and expensive process, and there must be a valuable find at the end. In other words, there must be gold at the end of the rainbow or you cannot gain title to public land today under the 1872 law. That, of course, is exactly what that chart demonstrates.

Mr. Chairman, thank you very much for a chance to come and testify in behalf of leaving the 1872 law as is, alive, well, intact and very dynamic.

Senator BUMPERS [presiding]. Congressman, thank you very much. I am going to look at that very carefully to see if I can find a box there which says at any point the government can keep this thing from going forward, because I do not think there is.

Let me ask you, if there always has to be gold at the end of this, how do these people sell some of these patented lands for $10,000, $12,000 or $13,000 an acre?

Mr. CRAIG. Mr. Chairman, I really believe that is quite simple to understand. My granddad homesteaded land in Idaho around the turn of the century, land that at that time was being given away by the Federal Government. He got it under a homestead. He developed it, he laid claim to it, and the Federal Government granted him that right because he worked the process.

At that time it was viewed as valuable and necessary to expand the growth of the western states.

Now I will have to admit that several years ago we sold some of that land for well over $1,000 an acre, and nobody at that time questioned whether we were ripping off the Federal Government or not because we had been granted title to that land literally 100 years before.

What I am suggesting is that if the process, which I believe is a lengthy and detailed process today, actually grants to an individual title or patent, fee simple title to that land, then whatever happens beyond that point is the right of that individual.

Now the BLM does not just arbitrarily and capriciously give land away. Hundreds of steps must be laid to by the individual before the BLM says you have a valuable find based on the market except in the instances as we know in the past on oil shale and some other kinds of mineral.

Senator BUMPERS. This land would not bring that kind of price if it had ever been mined. It means that somebody got a patent on land by stating that there were commercial minerals there, but they obviously never mined them or they would not be selling them.

Mr. CRAIG. No, I do not think that is the case.

Senator BUMPERS. You are not supposed to be able to get a patent until you convince BLM that——

Mr. CRAIG. If you convince BLM that there is a mineral there worth the value of mining.

Senator BUMPERS. But you will agree with me at that point that once that patent is issued that BLM does not further monitor it to see whether any mining ever took place or not?

Mr. CRAIG. No, I do not believe it is their responsibility. What they will do——

Senator BUMPERS. If I want to patent it and tell them there is a big commercial pile of minerals underneath there and they give me a patent to it, I can keep it, sell it, do whatever I want to with it.

Mr. CRAIG. You must demonstrate to them through core drilling and testing and material samples that there is, in fact, a valuable mineral. It is not an arbitrary process. It is a phenomenally lengthy and detailed process.

Now if you, Senator, or I had made that discovery and we were but a small miner and it was a very large deposit, it would not be unusual for you or me then to sit down and negotiate with a major mining company who might either pay us a very large sum of money for the property and the materials under it, or they might decide to take you in as a partner as part of the process.

Would substantial dollars change hands? Of course it would because you now have a valuable privately owned resource allowed under the law.

Senator BUMPERS. Congressman, I would like to sit here and go through this, but we are going to be here until midnight at the rate we are going.

Let me just ask you this question. If land the size of Connecticut is insignificant, what is significant?

Mr. CRAIG. All land is significant. All public land is extremely significant, and we must always assure that it is properly handled. That is your responsibility, Mr. Chairman, and that is my responsibility as public legislators. Public policy must assure the wise and judicious use of public lands.

Why I use that statement, Mr. Chairman, is that we often times like to use graphics or graphic kinds of statements to make a point. When somebody says, well, Congressman, what is the size of your district, I say, well, it is from here to Boston. It is not just across the street like a lot of people's districts. It is 600 miles long. We must develop a perspective.

Senator BUMPERS. Congressman, you mentioned the Carlin Gold Belt. Do you know who discovered the Carlin Gold Belt?

Mr. CRAIG. Well, I have worked with, let me see, two brothers out in Nevada, one of whom was instrumental in pioneering the concept; but specifically, I do not recall the names.

Senator BUMPERS. The USGS is really the organization that did most of the geological work and everything that made that possible.

Now, do you know of any way the United States will ever be reimbursed for USGS work in finding that magnificent gold find?

Mr. Craig. Well, right now the State of Nevada, which is a part of the United States, is getting an awful lot of taxes from it. It is employing thousands of people who are paying state property tax and U.S. income tax. They probably would not be working there and they might not be working anywhere at this moment.

I think there is reason to appreciate that part of the value of public resource is the wealth of a nation and that it employs our people and puts them to work and makes us strong as an economy.

Sometimes there is a real value in that dollar rolling down Main Street, whether it is Elco, Nevada or Washington, D.C. So right now, the United States as a gold producer is stronger today than ever before because of the Carlin Trend, and this Nation is extremely strong economically in that area for that purpose.

Are we gaining? We are gaining a tremendous amount from it, yes.

Senator Bumpers. Senator McClure.

Senator McClure. Thank you, Mr. Chairman, and thank you, Congressman. It is always a pleasure to have my Congressmen appear before this body and give testimony, and never more effectively than today. I appreciate your statement.

I might just say to the Mr. Chairman that one of the measures by which you can determine how much land has been patented in the history of this country may be that it is an area the size of Connecticut, and that might lead somebody to say there should be no more patents.

The area that has been transferred to airport use is double that quantity, and I have not yet heard anybody say we ought to stop all airports;

Or to put it another way, seven times as much territory is covered by highways today. I have not yet heard anybody say, my goodness gracious, highways cover seven times as much territory as Connecticut, so let us stop highways;

Or to put it another way, it is less than .14 percent of the Nation's land mass.

So we ought to get into some kind of perspective what it is that we are talking about in terms of relative interest, relative value and relative good for our country.

Congressman, I very much appreciate the statement that you made about the value to our country of a viable mining industry. I am constantly amazed at the way in which natural resources get measured in ways that other Federal expenditures do not. We have been engaged in this committee with so-called deficit sales on Forest Service lands. I see Associate Chief Leonard nodding his head out there in the audience.

We have been talking about that for some time without recognizing that that is the primary activity on the forestlands that returns any dollars to the Treasury. Yet, we spend a lot of money for social or political purposes in the management of the public lands that have no direct return in dollars.

Mining is no different. It may not have a direct return in terms of a royalty to the Federal Government, but it certainly does have very direct returns to the government of the United States in terms of its value to the citizens of this country. You couched it in terms of both personal and in the terms of the wealth of a nation.

Mr. CRAIG. Senator, I think the thing that is so important which we from Idaho certainly understand it that natural resources and the dollars they generate are looked at in many ways. One of the ways I lock at them is in loaves of bread that go on tables to feed children but is never talked about; or the dollars that buy the overhead projectors so the kids can learn in schools.

Now the reason that happens in the west and does not happen in the east is because in the west we have public resource that this Congress collectively and intelligently over the years has said some of that wealth ought to remain in those states for purposes of the economy of those states. Of course, that is what is important for all of us to understand, and I think sometimes we forget how it balances out.

Resource dollars are very important kinds of dollars not just to the States, of course, but to the Nation.

Senator MCCLURE. I thank you very much for your testimony.

Mr. CRAIG. Mr. Chairman, to correct the record at least on my part because I did have a lapse of memory, I was trying to remember John Livermore's name. Mr. Livermore discovered the Carlin Trend. USGS mapped the geology of the Trend, and it was Mr. Livermore, a private geologist, that did the original assay work that discovered the Trend itself.

Senator BUMPERS. Senator Murkowski.

Senator MURKOWSKI. I would just like to commend the witness.

Congressman Craig, I think your presentation is excellent, to the point, and I think depicting the wealth of the Nation as you have followed up by the comments of Senator McClure put it in a perspective that deserves a reflection, and you have given us that opportunity.

Mr. CRAIG. Thank you.

Senator BUMPERS. Thank you, Congressman.

We have not yet gotten to the list of witnesses. Our first panel is Mr. Robert Burford, Director of Bureau of Land Management, and Mr. George Leonard, Associate Chief of the U.S. Forest Service.

Gentlemen, we are honored to have both of you.

I am not going to start this timer, but in order to get out of here before midnight, as soon as our two administration witnesses testify I am going to be compelled to put the five-minute light on. I know that I will receive the cooperation of my colleagues here in the questioning period because all these hearings are always necessarily repetitious. The questions have a tendency to get repetitious.

We want to get the salient and the important parts of everybody's testimony and the good questions in the record, and I do not want to cut anybody off but when I look down the list of witnesses and see where we are right now, I can see we are really in for a long afternoon and evening.

Mr. Burford is accompanied by Mr. T.S. Ary.

Bob, why not proceed. Your name is first on my list.

STATEMENT OF ROBERT F. BURFORD, DIRECTOR, BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR, ACCOMPANIED BY T.S. ARY, DIRECTOR, BUREAU OF MINES

Mr. BURFORD. Mr. Chairman, once again I am happy to join you.

Senator BUMPERS. Pull that microphone right up next to you. We have a lousy sound system here.

Mr. BURFORD. As you may remember, this is not my first appearance in front of this committee. I did promise the last Senate committee that I was in front of that it would be my last appearance. I hate to break the promise and make you suffer through it; however, I would note that you put an undue limit on me because of the rapidity with which I speak, and some other people are going to get a lot more testimony in than I. I am used to having you pick on me, so we will let it go at that. [Laughter.]

I have a complete statement which I would request be entered in the record.

Senator BUMPERS. Without objection, your full statement will be submitted to the record.

Mr. BURFORD. I have a very short statement, anticipating from the looks of the witness list that we would not have much time.

In my more than eight years tenure as the Director of the Bureau of Land Management, I have witnessed considerable economic change in the American base and precious metal exploration and mining industry. The changes and the ease with which the Mining Law has allowed the industry to respond to them has strengthened my conviction that the fundamental principles of the Mining Law are sound. Those principles include the self-initiation of mineral rights, the right of free access across Federal lands, the security of tenure to the mineral deposit, and the concept of due diligence.

These principles must be exercised in a business and regulatory environment that does not impose unreasonable up-front costs if they are to work to the benefit of the industry and the public.

In the current North American mineral industry structure, there is little in the way of grassroots explorations by the large companies often referred to as "majors" whose focus tends to be more on production rather than exploration. Exploration has, for the most part, been left to the small company and the individual operator usually referred to as "juniors".

Incidentally, this is something that has happened mainly over the past 10 years when we saw a great depression in minerals, and many of the oil companies prior to that had gotten into mining operations and found out that they did not understand mining and disposed of their mineral interests. Many of the major companies that took over cut their exploration back and used the juniors, the small operators, to find ore, after which they entered into agreements with them on the development of those deposits.

Junior operators spend considerable time and effort to develop submittal properties to the majors for consideration. Precious and base metal mining has become increasingly concentrated in a few capital rich companies that have ready access to the Asian and European capital markets.

In contrast to the mining company majors, the exploration company juniors tend to be capital poor with limited cash reserves and limited access to capital markets of North America, Asia or Europe.

Northern Miner Press, Limited is a knowledgeable observer of the North American mining scene. Based on its most recent analysis of the U.S. industry done in preparation for their revised industry handbook, it estimates that there are about 1,150 companies active in the base and precious metal sector. Of these 1,150, only about 250 have any production that can be called significant. This excludes the small placer operations found in Alaska.

Put another way, only one in four companies is a miner, and the remaining three out of four are either looking for potential properties or are starting to develop properties. Most of the companies in the industry are easily classified as juniors.

Clearly, it is essential that the small company be allowed to operate in a changing industry environment. We must not drive the domestic exploration industry offshore and see it eventually replaced by U.S. subsidiaries of foreign capital-rich companies. Multiple adverse effects on the general economy of the mining States in the west would result.

Nevada is a prime example of the Mining Law successfully at work. Many of those claims in the Carlin Trend were staked years and years ago, some of them for metals other than gold before the new processes came on line.

In 1986 mineral production in Nevada was $904 million. The Nevada Bureau of Mines and Geology recently published a study of the economic impacts of the mineral industry on the State. They estimate that exploration expenditures in that State amounted to $76 million. In 1986 more than $296 million was spent in purchases in Nevada by the mining operators that year.

Furthermore, the mineral industry paid $21 million in State and local taxes directly, with an additional $4 million paid by employees in sales taxes and property taxes. Direct salaries paid to mining employees approximated $195 million, and the mining industry contributed to the statewide creation of nearly 17,000 jobs.

In the legislation which just passed in the State of Nevada, I think there was a new tax put on the gold companies in that State which brought close to $50 million from what I understand. I do not have the concrete figures with me, but I will verify that for the record.

[The information referred to follows:]

NEVADA VOTERS APPROVE $52 MILLION IN NEW MINING TAXES

Nevada miners will pay $52 million in new taxes over the next two years after voters in that state overwhelmingly approved the increase in May.

The measure, supported by the mining industry, allows the state to impose a 5% tax on net proceeds of mines during the next two years. About 36% of the eligible voters turned out for the special election.

The mining tax plan was put to the voters following a struggle between the mining industry and Gov. Bob Miller. He proposed an even higher tax of $118 million.

Casino owners are often targeted to tax increases. They joined the fray saying that it was time the mining industry began to pay its fair share of taxes.

Marvin Sedway, Democratic chairman of the Ways and Means committee, also opposed the the $52 million tax plan. "The amount they (the mining industry) would be paying is just a drop in the bucket to what they should be paying," he said.

The state senate rejected Miller's $118 million plan. Both sides then endorsed the $52 million plan and began urging voters to approve the tax.

Mr. **Burford**. This example—and there are many others—learly illustrates the economic benefits to be gained at the State and local levels through continued exploration and development under the principles of the present mining systems. The country has benefitted greatly from the Mining Law's fostering of exploration and mining. New wealth has been created from where there was none before; not simply a redistribution of wealth as would occur from service industries but, in fact, a magnificent addition to the Nation's riches.

In my general statement I go into a lot more of the history of the Mining Law. Its origins can be traced back clear to the 14th Century. From that evolved the mining laws in the public land States of the west because there were no mining laws when those States were territories, and there were actually no mining laws present in the eastern States or in the colonies. It evolved from the idea that the minerals belonged to the crown and that, by discovery, the citizens could take advantage of that.

That concludes my prepared testimony, and I hope I am within my allotted time.

[The prepared statement of Mr. Burford follows:]

STATEMENT OF ROBERT F. BURFORD
DIRECTOR, BUREAU OF LAND MANAGEMENT
U.S. DEPARTMENT OF THE INTERIOR
BEFORE THE SUBCOMMITTEE ON
MINERAL RESOURCES DEVELOPMENT AND PRODUCTION
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
JUNE 7, 1989

First, I want to thank Senator Bingaman for inviting the Department to this hearing on the 1872 Mining Law.

The Administration stands ready to work with the Congress to review the Mining Law and other mining issues to ensure that mineral development is compatible with environmental considerations and laws. As Secretary Lujan has indicated in response to a question at his confirmation hearing, "I recognize the desires of Congress and the public to be increasingly assured that our resources are being managed prudently and in the best interests of all. Therefore, it is appropriate that there be regular oversight of all our programs. If confirmed as Secretary of the Interior, I stand ready to work with Congress if it chooses to review the working of the Mining Law of 1872, as amended, in today's environment." Let me also say that the Administration believes this law has served the Nation well during the past 117 years. This law has not remained untouched during the 117 years, having been modified on several occasions.

The Administration has not had sufficient time to review potential changes to the 1872 Mining Law in S. 1126 introduced by Senator Bumpers yesterday. The Administration will undertake a full interdepartmental review of the bill and will provide comments to Congress.

The question of the current applicability of the Mining Law of 1872 is a matter directly related to the vital interests of the United States, namely our national security and economic health. The Strategic and Critical Materials Stock Piling Act of 1946 (50 U.S.C. 98 et seq.) mandates ". . . development of . . . materials within the United States, and thereby decrease and prevent wherever possible a dangerous and costly dependence of the United States upon foreign nations for supplies of these materials in times of national emergency." The Defense Production Act of 1950 (50 U.S.C. app. 2061 et seq.) mandates ". . . expansion of productive capacity and supply beyond the levels needed to meet the civilian demand." The Mining and Minerals Policy Act of 1970 (84 Stat. 1876) mandates ". . . orderly and economic development of domestic mineral resources . . . to help assure satisfaction of industrial, security and environmental needs." The National Materials and Minerals Policy, Research and Development Act of 1980 (94 Stat. 2305) and the National Critical Materials Act of 1984 (98 Stat. 1248) both reiterate Presidential responsibilities for adequate supplies of mineral materials. The 1980 Act states that ". . . it is the continuing policy of the United States to . . . promote and encourage private enterprise in the development of economically sound and stable domestic minerals industries . . ." Thus, the

Congress has spoken in numerous instances on the importance of domestic strategic minerals production. The Mining Law has served as a major vehicle to fulfill these strategic objectives.

CHANGES IMPACTING THE MINING LAW

The scope of the General Mining Law has been considerably changed since 1872. Judicial and administrative agency decisions as well as other laws have molded the original Mining Law to reflect the changing resource and environmental priorities of the Nation.

In 1910, for example, the Pickett Act enabled the President to withdraw Federal land from entry for coal, oil, gas, and phosphate under the Mining Law. This withdrawal provision was later extended to all nonmetallic minerals.

The Potash Leasing Act of 1917 removed potash from the Mining Law and made it locatable. The Mineral Leasing Act of 1920 removed oil, gas, coal, sodium, phosphate, oil shale, and several other minerals from the Mining Law and subjected them to leasing. Also, common varieties of sand, stone, gravel, pumice, pumicite, cinders, clays, and other minerals were removed from the Mining Law and made saleable through competitive bidding under the Surface Resources Act of 1955.

The Federal Land Policy and Management Act of 1976 set up a comprehensive land planning system to meet multiple land use objectives. It established a Federal mining claim recording system, which requires an annual filing of an affidavit of assessment work or a notice of intent to hold.

In addition to land use laws, legislation was passed that addressed the Nation's environmental concerns. The Clean Air Act was passed in 1963, the National Environmental Policy Act in 1969, the Clean Water Act in 1972, and the Resource Conservation and Recovery Act in 1976. During the 1973-1987 period, the mining industry spent $4.4 billion on new plant and equipment to comply with air, water, and solid-waste regulations. These environmental laws have had a profound impact on the domestic mining industry and are the law of the land affecting all mining activities on public lands.

Environmental regulations issued by the agencies responsible for the administration of these laws must be observed by miners. Regulations issued by the Department of the Interior set guidelines and requirements for mining that implement the Congressional charge to the Secretary to prevent unnecessary or undue degradation of the Federal lands. Our enforcement of these rules will be enhanced by additional receipts from a recent increase in mining claim recordation fees. This includes an increase in the initial filing fee from $5 to $10 and the imposition of a $5 annual filing fee, among other fee increases. These mining fees, which will used to free up funds that will be used to ensure that mining operations conform to the applicable environmental laws and regulations, are expected to increase from about $800,000 in fiscal year 1988 to about $6 million in fiscal year 1990.

THE MINING LAW AND HARDROCK MINERAL EXPLORATION

Mineral exploration is an extremely risky business, yet the future of the minerals industry and the health of the U.S. economy depend on its success. Most hardrock minerals occur in geologic environments significantly different from the fuel, fertilizer, chemical, and common construction minerals. The latter minerals are mostly of sedimentary origin, do not exhibit as widely variable ore grades as many hardrock minerals, and generally occur in well-defined stratabound orebodies.

In contrast, the hardrock minerals, including most of the strategic and critical minerals, are often associated with igneous and metamorphic rocks, and ore grade is typically nonuniform throughout the deposit, the boundaries of which are not sharply defined. The risk involved in exploring for discordant, structurally complex orebodies is much greater than for bedded ones. Valuable hardrock mineral deposits are often of such a nature that they could be missed by drill holes 25 or 50 feet away, whereas major sedimentary occurrences can be revealed by drill hole spacings measured in miles.

Explorationists must have the freedom to decide where to explore because the location of a mineral deposit is not always coincident with manmade land boundaries. Mining executives must also be able to decide when to explore given the realities of a global market system. In addition, a company must be guaranteed the right to mine a deposit in order to justify the large expenditures necessary to discover the deposit and pay for the preceding unsuccessful ventures.

The 1872 Mining Law provides for the crucial rights of self-initiation and security of tenure. The Law does not require a step-by-step approval process for each phase of exploration and development to the extent of a leasing system. The Government does not have to determine how any and all interested parties may acquire access to the lands and does not have to assume any of the financial risks associated with the success or failure of mineral ventures.

The Mining Law of 1872 thus fulfills the Secretary's responsibility "to foster and encourage . . . the development of economically sound and stable domestic mining, minerals, metal, and mineral reclamation industries . . ." as required by the Mining and Minerals Policy Act.

HISTORY

The origin of the Mining Law of May 10, 1872, can be traced to the 16th century and reflects our close ties to our English and Spanish heritage.

Early American colonial charters contained outright grants of mineral land to settlers, a carry-over from the original Crown grants; however, these grants were accompanied by certain permanent reservations of precious metals to the sovereign. This formed the basis for the early traditions and customs regarding mineral rights for the colonies and the eastern part of the United States generally until the early 1800's.

In the western states, and expressly in the Southwest, mining customs and traditions were derived from the Spanish Royal Code of 1783. This code formed the basis for acquisition of mineral rights by miners and settlement of disputes between claimants.

Until 1849 there was no formal mining law in the United States. Congress passed several leasing or sales acts of limited duration for gold, silver, lead, and iron. These acts were administered by the War Department. In 1849, when the California gold rush started, miners were technically in mineral trespass when they located claims on the public domain. The gold rush brought into conflict the two mining traditions. In 1860, the silver strike in the Comstock Lode in Nevada started a second mining rush to the West, opening up the conflicts between the two mining traditions. As the eastern moneyed interests were financing the Comstock Lode as well as the California Mother Lode, the question of security of title and tenure became a major political issue in Congress.

From 1865 to 1885, congressional policy for the public lands focused on encouraging westward migration of people to settle and develop the West. In furthering this congressional policy, a series of statutes was passed including various homestead acts, agricultural entry laws, soldier compensation acts and several acts designed to emphasize mineral exploration and development.

On July 26, 1866, the first mining law was passed as the Lode Law of 1866. This act provided for the entry and location of lode claims, assessment work and patents for lode claims.

The Placer Act was passed on July 9, 1870. It provided for the entry and location of placer claims on non-agricultural land, for location by legal description, and for patent.

These two acts were consolidated, with amendments, into the General Mining Law of May 10, 1872. This statute is the basis for hardrock mineral mining today.

PRINCIPLES OF THE MINING LAW

Basically, the General Mining Law of 1872, as amended, consists of five elements: discovery of a valuable mineral, location of mining claims and sites, recordation of mining claims and sites, maintenance - annual work and surface management - of mining claims and sites, and mineral patents.

Discovery

There is no Federal statutory definition of what constitutes a valuable mineral deposit. Several judicial and administrative rulings or declarations have filled that gap. In 1894 in the case of Castle v. Womble, the Department of the Interior established the "prudent man rule." This rule states:

> ". . . where minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success in developing a valuable mine, the requirements of the statutes have been met."

This definition was approved by the United States Supreme Court in 1905.

In 1968 in the case of U.S. v. Coleman, the Supreme Court approved the marketability test as a complement to the prudent man rule. This test requires a showing of marketability to confirm that a mineral could be mined, removed and marketed at a profit. In other words, the marketability test takes into account economics, requiring the claimant to show that there is a reasonable prospect of selling material from a claim or a group of claims. It is not necessary that the material has been sold or is selling at a profit but that there is a reasonable likelihood that it could be sold at a profit.

Location

Mining claims may be located only by citizens of the United States, persons who have declared an intention to become citizens and corporations organized under any State law. Upon making a discovery of a valuable mineral on unappropriated public domain land, an unpatented mining claim may be located which grants the locator an exclusive possessory right against the United States and other claimants. This possessory right allows the locator to continue to develop the claim as provided for by law. It is valid against the United States and other claimants only after a valuable mineral deposit has been discovered.

There are two types of mining claims - lode and placer. There are two additional types of mineral entries that may be located. A mill site may be located on unappropriated public domain land that is nonmineral in character. It is used for the erection of a mill or reduction works or for other uses reasonably incident to the support of a mining operation. A tunnel site may be located on a plot of land where a tunnel is run to develop a vein or lode or to discover an unknown vein or lode.

Staking a mining claim includes erecting corner posts or monuments, posting a notice of location on a post or monument in a conspicuous place and side-line or end-line posts or monuments.

Recordation

Prior to the Federal Land Policy and Management Act, claimants were required to file their location and assessment notices only in the office of the County Recorder or County Clerk in the county in which the claim was located. Since the enactment of the Federal Land Policy and Management Act, notices of location and other notices must be filed in the Bureau of

Land Management. This requirement has proved very effective. It lets us know where mining claims are located, which claims are still viable and which have been abandoned.

Maintenance

The General Mining Law of 1872 requires performance of an annual minimum of $100 worth of labor or improvements to retain a possessory interest in the claim or site. Most States require that an affidavit of assessment work be filed with the county in which the claim is recorded. The Federal Land Policy and Management Act requires that an affidavit of assessment work be filed with both the local county office and the proper Bureau of Land Management State office.

Owners of mill sites or tunnel sites are not required to file notices of assessment work but are required to file a notice of intent to hold the site.

Exploration and mining activities on BLM-administered lands are subject to regulations found in 43 CFR 3809 (under the authorities of 30 USC 22, 43 USC 1201, 43 USC 1701 et. seq.), which require that an operator prevent unnecessary and undue degradation and perform reasonable reclamation. In certain situations -- usually disturbance of 5 acres or more of surface -- an operator is required to prepare a plan of operation and a reclamation plan that is approved by the Bureau of Land Management. Bonding is discretionary with the authorized officer for plan-level mining operations. All operators with a record of noncompliance must be bonded. A notice is usually required for surface disturbance of less than 5 acres.

Exploration and mining activities on wilderness study areas are subject to regulations in 43 CFR 3802 and Interior Management Policy and Guidelines for Land Under Wilderness Review. A plan of operation is required for all activities other than casual use. Activities in wilderness study areas must be reclaimed to the point of being substantially unnoticeable by the time the Secretary of the Interior makes his recommendations for wilderness suitability or nonsuitability to the President.

In addition, many State governments have mining and reclamation requirements. The Bureau of Land Management generally coordinates with the relevant State agency in the review and approval of mining and exploration plans.

Patents

It is not necessary to have a patent to mine and remove minerals from a mining claim. However, a patent gives the owner exclusive title to the locatable minerals and, in most cases, to the surface and other resources. In order to exercise this right, claimants must have performed at least $500 worth of labor or improvements per claim; had a mineral survey and plat prepared at their expense; shown that they hold possessory rights by chain of title documents; and published a notice for potential adverse claimants to assert their claims.

LIMITED ACREAGE IMPACTED BY THE MINING LAW

The recent GAO report on the Mining Law of 1872 correctly stated that over the last 117 years about 3.2 million acres of public land have been transferred under the Law's patent provision. While appearing large, this 3.2 million accounts for only 0.4 percent of the 732 million acres of public lands subject to surface and subsurface mineral development estimated by the Bureau of Land Management. About 2.0 million of the 3.2 million acres were patented before the passage of the Mineral Leasing Act of 1920. About 300 million acres of public land have been patented under the Homestead Laws since 1862. In summary, Mining Law patents account for only 0.3 percent of all public domain land ever patented.

Not all of the 732 million acres of Federal land are available for patenting. Of the 432 million surface and subsurface acres available for the development of hardrock minerals, the 3.2 million acres of land patented for mining accounts for an estimated 0.7 percent. In addition, over the last seven decades, legislation has removed from the Mining Law both fuel minerals, such as coal, gas, and oil, and most common variety minerals such as sand, gravel, stone, and cinders. The Bureau of Mines, in its Inventory of Land Use Restraints Program, is making an effort to determine the exact amount of Federal land that has been withdrawn and restricted.

Furthermore, recent studies under the Inventory of Land Use Restraints Program show that the amount of Federal lands available for mineral exploration and development varies considerably among the States. In Alaska, where about 87 percent of the total acreage of the State is Federally-owned, only about 15 percent of the Federal lands are available for mineral activity. In Arizona, Colorado, and Washington, 52, 48, and 39 percent of Federal lands, respectively, are available for mineral exploration and development. It should be apparent, then, that the Mining Law's patent provision has not allowed the transfer of relatively large acreages of Federally-owned lands as standard practice.

The patenting of Federal lands under the Mining Law of 1872 has given many people the impression that the 3.2 million acres of Federal lands patented for mining simply vanished with no benefit whatsoever to society. The recent GAO report made no attempt to explain that in the vast majority of cases, the current mining law's patent provision allowed mining to occur in rural areas of the United States where substantial economic benefits occurred.

ECONOMIC IMPACT

The 1872 Mining Law has facilitated the discovery of and production from numerous important deposits, including strategic and critical minerals vital to the health of the U.S. economy. I cannot describe the direct economic impact occurring solely for patented lands chiefly because of proprietary reasons. But

I can describe what metal mining, the most prevalent type of mining on patented lands, has meant to the economies of several western states.

Mining locations, under the Mining Law of 1872, may only be made on unappropriated public lands in 19 States. Of these, 11 western states accounted for at least 65 percent of the total value of U.S. metallic mineral production in 1987 and 1988 as measured by the U.S. Bureau of Mines. (See Appendix)

The importance of metal mining in these 11 States can also be measured from gross national product by industry adjusted for inflation. This measure expresses in constant dollars the market value of goods and services produced by the Nation's industries within a specified period of time. In 1986, the latest year for which complete data are available, these 11 States accounted for 70 percent of the U.S. production of metallic mineral mines and mining services.

Gross national product and a related measure, gross state product, can also be used to compare the contribution of mining to that of other industries in a region. While metal mining is one of the smallest components of total U.S. gross national product, contributing an average of 0.07 percent to the total over the last five years, gross state product by metal mining is much more important to the economies of many western states where mining locations can be made. In 1986, for instance, metal mining's contribution to the Arizona economy was 15 times more important than total U.S. metal mining was to the economy of the Nation as a whole. Metal mining in Nevada was 42 times more significant, accounting for an estimated 2.7 percent of gross state product.

Most metal mining occurs in rural counties of the western United States that contain large amounts of public lands. Therefore, metal mining and processing, along with metal mining services are important contributors to employment and income in these counties. Bureau of Mines analysts recently looked at a total of 19 counties in 5 States and measured the direct contributions of metal mining and processing to total county employment and personal earnings. These States, Arizona, Colorado, Idaho, Nevada, and New Mexico, produced nonfuel metallic minerals valued at $6.0 billion in 1988, about 59 percent of the total value of U.S. production. They also contained varying proportions of Federally-owned lands, ranging from 31 percent of total state acreage in New Mexico to 85 percent in Nevada.

Eighteen of the 19 counties depended on the metallic mineral industry for jobs and income. In sixteen of these counties the Federal government owns 50 percent or more of the total land. At the same time, the direct contributions of metal mining and processing to both total county employment and personal earnings in 11 of these sixteen counties exceeded 10 percent in 1986, with the contributions of metal mining exceeding 20 percent for both employment and earnings in 5 of these counties.

Nevada, with 85 percent of its land owned by the Federal government, offers a striking example. Significant metal mining employment occurs in 5 counties where the Federal government owns more than 75 percent of the land. In Eureka County, Nevada, for instance, with 81 percent of its land owned by the Federal government, the gold and silver boom increased employment and personal earnings substantially. In 1981, metal mining accounted for 42 percent of the county's employment. By 1986, it had increased to 62 percent of the county's employment. Moreover, the above-average earnings of people engaged in metal mining accounted for a significant portion of Eureka County's total earnings by place of work. In 1981, metal mining contributed $10.0 million, or almost 60 percent of the county total. In 1986, metal mining's share was $28.8 million, or about 81 percent of total county earnings.

Two facts stand out in this analysis. First, the patent provision of the Mining Law has allowed local economies to prosper from mining. And second, Federal land ownership still remains significant in the regions where much of the mining occurs.

The Law has remained flexible as shown by the fact that it has accommodated everything from recovery of gold placer deposits at Nome, Alaska, and the silver deposits of the Coeur d'Alene district, Idaho, to the large open pit porphyry copper mines such as the Bingham pit in Utah, and to the giant underground mines like the Henderson molybdenum mine in Colorado.

CONCLUSION

In summary, Congress has maintained a careful eye on the public lands, and has made adjustments to the Mining Law and related public land statutes when required. Through these amendments and adjustments I can safely say:

(1) the Mining Law, when it was enacted, was well-suited to the needs of a sizeable and sophisticated hardrock mining industry,

(2) the Mining Law has worked well for over a century as a fair, efficient and predictable basis for one of the world's most prolific and successful hardrock mining industries,

(3) the Supreme Court has sorted out most of the principles involved leaving us today with a common law on mining that renders the Mining Law highly predictable,

(4) the Mining Law has accommodated changes for development, environmental controls, and resource and land-use planning, and

(5) the Mining Law continues to provide incentives to persons willing to assume the risks -- and they are great -- of exploring for hardrock minerals.

Finally, the Administration has not had sufficient time to review potential changes to the 1872 Mining Law in S. 1126 introduced by Senator Bumpers yesterday. The Administration will undertake a full interdepartmental review of the bill and will provide comments to Congress.

APPENDIX

Table 1.-- Total value of nonfuel metal mineral production for principal producing Western States and the United States (millions of $ and percent of U.S. total)

State	1987	1988
Alaska, Arizona, California Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah and Washington	$4,810.8 (65.0%)	$ 7,234.5 (69.0%)
United States	7,445.8	10,428.2

Source: Bureau of Mines

Table 2.-- Multipliers indicating how much more important metal mining is to selected State economies than to the total U.S. economy.

State	1981	1986
Alaska	0.9	2.2
Arizona	18.7	15.0
Colorado	7.5	6.6
Idaho	9.5	12.6
Montana	6.4	10.1
Nevada	14.5	42.0
New Mexico	13.4	9.6
Utah	14.5	7.5

Source: Bureau of Economic Analysis, U.S. Department of Commerce.

Table 3.-- Direct contributions of metal mining and processing to total employment and personal earnings in each county. (percentages)

County	% land owned by Fed govt	Employment 1981	Employment 1986	Personal earnings 1981	Personal earnings 1986
Arizona	43				
Greenlee	58	63.0	45.0	82.0	69.0
Gila	58	30.0	17.0	53.0	33.0
Pinal	22	25.0	11.0	40.0	19.0
Pima	27	3.0	0.6	6.5	1.6
Colorado	36				
Clear Creek	75	43.0	24.0	64.0	47.8
Lake	60	60.0	24.0	78.8	48.9
Idaho	64				
Custer	93	8.1	18.8	14.9	38.3
Owyhee	84	6.3	5.2	15.3	12.4
Shoshone	74	29.2	16.7	45.0	35.5
Nevada	85				
Elko	75	4.0	5.0	7.1	8.8
Eureka	81	42.0	62.0	59.8	81.3
Lander	86	25.0	30.0	35.0	49.0
Nye	98	8.0	6.0	9.6	7.1
White Pine	97	9.0	13.0	12.9	26.0
New Mexico	31				
Cibola	57	1/ 16.9	3.3	1/ 34.1	8.7
Grant	64	24.7	15.8	42.0	31.0
Taos	47	7.5	3.6	17.0	10.3
Utah	64				
Grand	70	10.3	4.1	20.0	9.4
San Juan	51	8.0	4.5	15.1	10.6

Source: Estimated from data provided by the Bureau of Economic Analysis, U.S. Department of Commerce, and employment data appearing in various issues of the annual County Business Patterns (Bureau of the Census). Employment includes full and part-time employees and proprietors. Earnings includes wages and salaries, proprietors' income, and other labor income such as employer contributions for private pensions, private retirement programs, and other fringe benefits. Percentages for Cibola County, New Mexico, and Grand and San Juan counties, Utah, reflect considerable uranium mining.

1/ Percentages are for 1982 since Cibola County was separated from Valencia County in June 1981.

Senator **Bumpers**. Thank you, Mr. Burford.
Mr. Leonard.

STATEMENT OF GEORGE M. LEONARD, ASSOCIATE CHIEF, FOREST SERVICE, DEPARTMENT OF AGRICULTURE, ACCOMPANIED BY PAMELA PEACH, OFFICE OF THE GENERAL COUNSEL

Mr. **Leonard**. I am accompanied today by Pamela Peach from the Office of General Counsel, the Department of Agriculture. We appreciate the opportunity to testify on the 1872 Mining Law.

The mineral business is big business on the national forests. We process about $3.5 billion worth of minerals annually from the national forest, and our minerals and geology staff estimates that about $700 million per year comes from the hardrock minerals which are the subject of this hearing today.

As you are aware, the Forest Service has a long history of administering the surface resources and minerals in conjunction with those on National Forest System lands. In recent decades it has been a cooperative relationship between the Forest Service, the Bureau of Land Management, the other agencies within the Department of Interior and the mineral industry. I think the increasing awareness of the environmental concerns has led to largely environmentally sound operations on the mining claims and patented lands within the national forest.

Our mission in relation to mineral resources on the national forest is to both encourage and facilitate their orderly exploration and development but to do it within the context of our overall multiple use charter for those lands.

I would like to observe that our preliminary review of S. 1126 indicates that several of those provisions of that act do relate directly to areas that are within the responsibility of the Secretary of Agriculture and in areas where the Secretary has issued regulations under the existing Organic Act and other statutes relative to the national forests. There is not a great deal of difference actually in the way we administer those resources under those existing regulations and the framework that is proposed in S. 1126.

The administration, however, has not had an opportunity to fully review S. 1126 and, therefore, we do not have a specific position on the bill at this time. The administration is committed to undertaking a full interdepartmental review of S. 1126 and will provide detailed comments to the Congress as soon as possible.

Certainly we in the Forest Service stand ready to work with the Congress in reviewing this act and ensuring that we can carry on these activities on the national forest consistent with our overall multiple use charter.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Leonard follows:]

STATEMENT OF
GEORGE M. LEONARD, ASSOCIATE CHIEF
FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

Before the
Subcommittee on Mineral Resources Development and Production
Committee on Energy and Natural Resources
United States Senate

Concerning S. 1126, a bill entitled the "Mining Law of 1989."

June 7, 1989

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

It is my pleasure to testify for the Department of Agriculture on S. 1126, a bill that would "provide for the disposition of hardrock minerals on Federal lands."

The Administration has not had sufficient time to review the potential changes to the 1872 Mining Law as proposed by Senator Bumpers in the bill that was introduced yesterday. The Administration will undertake a full interdepartmental review of S. 1126 and will provide comments to Congress. We stand ready to work with Congress to ensure that the mining law and other mining issues are compatible with environmental considerations. We recognize the need to address some areas of concern under current law.

As you are aware, the Forest Service has had a long history of administering surface management activities conducted pursuant to the Act of May 10, 1872 (30 U.S.C. 22 et seq.) on National Forest System lands. In recent decades, the cooperation between the Forest Service, the Bureau of Land Management, and the minerals industry, combined with an increased environmental awareness and ethic on the part of the mining community has resulted in environmentally sound minerals exploration, development, and production. Annually, nearly $700 million worth of minerals are produced from over 1200 mines within the National Forest System under the authority provided by the 1872 Mining Law. Over 7,000 mining operations were ongoing within the National Forest System as of March 6 of this year.

Our mission in relation to mineral resources on National Forest System lands is both to encourage and facilitate the orderly exploration, development, and production of these resources to meet the present and future needs of the Nation. We ensure that mining activities are conducted in an environmentally sound manner, are fully integrated with planning for and managing all other resources, and are followed by reclamation of the disturbed areas.

I would like to observe that our preliminary review of S. 1126 indicates that several of the provisions relate to areas for which the Secretary of Agriculture has already issued regulations. These regulations, combined with current environmental statutes, are now used to administer mineral activities on the National Forest System.

This concludes my testimony. I would be pleased to answer questions that members of the Subcommittee may have.

Senator **Bumpers**. Thank you, Mr. Leonard.

Mr. Burford, how many claims are presently on file that you know of either with BLM or the county courthouses?

Mr. **Burford**. Any claims that are on public lands are on file with the Bureau of Land Management or else they are void, because FLPMA says that they have to be filed by certain——

Senator **Bumpers**. Could I help? I understand the figures are 1,200,000 claims filed.

Mr. **Burford**. I think that is about right. I was going to look up the exact figure, but that is approximately right.

Senator **Bumpers**. Do you know what the average size of those claims are each? Is 20 acres a fair figure?

Mr. **Burford**. 20 acres.

Senator **Bumpers**. So there is 24 million acres on which claims have been filed that are on file now.

Mr. **Burford**. Yes.

Senator **Bumpers**. Of all the claims right now that have been patented, do you know how many of them or what percentage have active mining operations going on?

Mr. **Burford**. That would be something that we do not have figures on in the Washington office, I do not believe. I would like to defer to a staff member to see if he has it.

We do not have those figures in here.

Senator **Bumpers**. How about unpatented claims? Can you answer that? How much mining is going on on unpatented claims?

Mr. **Burford**. About 16,000 operations over the life of the surface mining regulations. We have had 16,000 registered, and those regulations took effect in 1981.

Senator **Bumpers**. What activities in order to keep a claim viable are presented to BLM as the kind of work that has to be done to keep it alive, the $100 annual?

Mr. **Burford**. The $100 annually or notice of intent to maintain, has been suggested in house. We have never serviced it much, but we use an either/or situation where somebody can either pay $100 cash or do $100 worth of work.

Senator **Bumpers**. What kind of work do people normally do to substitute for the $100 fee?

Mr. **Burford**. They could drill their shaft a little deeper or do some exploratory drilling or almost anything associated with it.

T.S. said he would like to try that.

Mr. **Ary**. Mr. Chairman, the rule is any work that will benefit the claim and cause it to reach closer to production.

Senator **Bumpers**. Mr. Ary, GAO says that they found virtually no claim on which the annual work actually brought that claim closer to productivity.

Mr. **Ary**. If they actually said that and saw that, they did not look at the majority of the claims on the public lands, because very few of the active claims have work that does not show.

If you do things that develop that claim, you are going to see it. I am not privy to the claims that they have looked at, but I would question their——

Senator **Bumpers**. Here is an ad that is in the California Mining Journal. This is June 1989.

Attention Northern Nevada Claim Owners. Normally claim owners don't take assessment work very seriously. However, in our area this should not be the case. With the present mining boom in Northern Nevada, many companies are watching to see if assessment work is being done and filed by the proper time.

Milcon, Inc. of Winnamucka, Nevada wishes to extend to you the service of completely performing all of your assessment work needs, including the following: Trenching a 10 foot long by 2 foot deep trench; pulling a sample from the bottom of the trench; filling the trench and leveling the ground; planting grass seed approved by BLM; mapping and plotting hole locations on each claim; filing all documents with the county recorder and BLM by the appropriate time.

Call now for more information and prices.

[The ad follows:]

★ ★ ★ ATTENTION ★ ★ ★

NORTHERN NEVADA CLAIM OWNERS

Normally claim owners do not take assessment work very seriously. However, in our area, this should not be the case.

With the present mining boom in northern Nevada, many companies are watching to see if assessment work is being done and filed by the proper time.

Micon Inc. of Winnemucca, Nevada, wishes to extend to you the service of completely performing all of your assessment work needs including the following:

1. Trenching a 10 ft. long x 2 ft. deep trench.
2. Pulling a sample from the bottom of the trench.
3. Filling the trench and leveling the ground.
4. Planting a grass seed approved by the BLM.
5. Mapping and plotting hole locations on each claim.
6. Filing all documents with the county Recorder and BLM by the appropriate time.

Call now for more information and prices!

MICON INC.
Drawer 1940
Winnemucca, Nevada 89445

(702) 623-1105

Mr. ARY. I think when you get ads of people that are in the business of doing the assessment work, they touch upon those things that are easy to do and that they know people have been doing.

The digging of pits that the GAO referred to is not necessarily an assessment work activity, but it was a requirement by law for the old location. A lot of the pits that were going across the countryside were the original discovery pits until the States changed their rule.

After that time, the pits were then used for the sampling of the ore to find out if the deepening of the pit put it any closer.

The real intent of the assessment work is to further develop the claim. If I, as a company individual, am looking at an area seriously, I would check that courthouse record also, and if the claimants have not filed their assessment work affidavit or I am in the field and I know they have not done the assessment work, I generally go out and jump that claim because the claim is open for relocation.

That is what keeps us all doing our assessment work, because we can lose the claim if a third party comes in and gets it.

Senator BUMPERS. Mr. Ary, do you collect enough in fees to pay for the monitoring of this program?

Mr. ARY. There is no monitoring of the assessment work by the Bureau of Mines or the BLM. The fees that they collect are fees to take care of the recording of the affidavits of labor.

Senator BUMPERS. I have heard it said that there are as many as 8,000 claims for each person charged with the responsibility for taking in these annual assessments and determining whether they are legitimate or not.

Mr. ARY. I am not sure that that is correct. It might well be. The county recorder, for instance, you mail your affidavit of labor in and she records it. I do not know how many the BLM have, but——

Mr. BURFORD. We have an office in every district, and those affidavits are received there. When they are not taking affidavits on mining claims, they are doing other work for the public.

Senator BUMPERS. Bob, here is a letter that was sent to you from the area manager of the Folsum resource area. He is saying that not only would a $10 fee not be enough, but a $100 fee would hardly be adequate.

Do you recall receiving this memo, incidentally?

Mr. BURFORD. I do not recall that one in particular.

Senator BUMPERS. The memo is from the area manager. It is a long one, and without objection I will insert this memo in the record.

[The information referred to follows:]

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
FOLSOM RESOURCE AREA
63 Natoma Street
Folsom, California 95630

IN REPLY REFER TO
3809
CA-018

MEMORANDUM

TO: Director

THROUGH: D. M. Bakersfield, S. D. California

FROM: Area Manager, Folsom Resource Area

SUBJECT: Mining Claim Recordation Regulations, Request for Comments

The $5 fee for filing new mining claims should be raised to a minimum of $100 instead of the $10 proposed in the new rulemaking published in the Federal Register on June 23, 1988. As the Area Manager of the Folsom Resource Area, Bakersfield District of BLM, I have local management responsibility for public lands in the Mother Lode region of California. As such, I deal directly with hundreds of miners, thousands of claims and most aspects of the mining law. My experience with the mining law and it's costs of administration lead me to disagree with the statement on page 23720 of the Federal Register Notice which states, "The Bureau has concluded that the proposed fees are necessary to put the mining law administration program on a cost-recovery basis as mandated by Title V and urged by the Comptroller General and the Congress. The proposed fees will not cover all costs associated with the program but only those costs which the Bureau has concluded result from a citizen locating, maintaining and operating a mining claim."

There are several of reasons why I the conclude that a $10 filing fee and associated fee is not realistic in covering the costs of the mining program.

Our present costs of administration have little correlation with the actual costs of effective administration. In the situation I am familiar with, our office has one geologist to administer 8,000 claims located in 19 counties. There are hundreds of cases where unnecessary and undue degradation are occurring. Under current conditions we only have the manpower to examine Plans of Operations, some notices and the most vociferous public complaints. Unfortunately, the history of the vast majority of claims is one of failed attempts. These attempts leave in their wake, environmental disturbance, abandoned equipment, vehicles, shelters, 55 gallon drums of unknown materials and other industrial strength litter. Presently, mining law administration does not include the clean-up and rehabilitation of such sites. This is a cost of administering the mining law that is going unaddressed but one which greatly effects the public and their land.

Mining claims, especially placers, are concentrated on rivers and streams in Northern California. Therefore, mining can have considerable impact on stream systems and adjacent riparian habitat. In some cases, claims are located in portions of Wild And Scenic River or Wilderness Study Areas. These areas are given priority for administration, but this occurs at the expense of other valuable habitat areas. Calculating the cost of administering the mining law should include the expense to effectively address the entire spectrum of mining-related problems on all claims under our administration.

Public complaints about mining claims are a daily occurrence. These complaints vary from access road disagreements to shoot-outs between claimants. The cost of investigating these complaints should be attributed to mining law administration but isn't due to lack funding. Instead the costs are buried in other programs. Public complaints often center around public safety and must be attended to and taken seriously.

The proposed $10 fee is not only too low to meet our stated goals and those of Congress, low fees actually drive up the cost of mining law administration and create problems for the public and lead to the degradation of public land.

Filing fees of only a few dollars encourage individuals to file frivolous mining claims for purposes which frustrate the intent of the mining law. Many of the hundreds of cases of unauthorized occupancy we deal with result from misuse of the mining law. For a mere $5 (or $10), dishonest citizens acquire equity in the public land for purposes unintended under the mining law. All too frequently, these bogus claims become a public nuisance or worse, a threat to public safety. The claims generally suffer from environmental abuse. The Bureau (and frequently local law enforcement) must remedy the problem, often at substantial cost, especially where hearings or court proceedings are required. I believe a fee of $100 or more would substantially reduce the incidence of such frivolous filings. On the other hand, I believe no legitimate mining company or responsible miner would find a $100 filing fee to be too big an investment in a worthwhile claim. After all, $100 is about 1/4 oz. of gold.

In fact, unrealistically low filing fees are an obstacle for legitimate miners. Since unrealistically low fees encourage frivolous claims, much of the public land open to claiming is claimed by those with no interest in mining or ability to mine. In fact, a de facto withdrawal results. This is of concern to some of the mining associations in this area.

To meet the goals stated in the Federal Register, a $100 filing fee would serve well. It would also help alleviate some of the more serious problems associated with mining law administration problems, which have been briefly outlined. The increase to a $100 fee would seem to allow the Bureau to cover the actual costs of administration without undue economic hardship on legitimate miners and it would better serve the public and the management of their lands.

In this end, it is proposed that 50% of the fee increase be returned to the resource area in which it was collected to allow rehabilitation of damaged public lands. This would include habitat restoration, stream rehabilitation, junk removal, removal of unnecessary roads, eliminating hazardous mine shafts and other physical repair of lands damaged by mining.

Less significant but still important would be to establish a $10 rather than a $5 fee on annual filings, transfers and amendments. Clearly, $5 does not cover personnel costs, on average, for these administrative actions. Frequently, transfers and amendments are very complicated and require considerable staff time.

If the fee were increased to $100 for new filings and $10 for other actions, about $24 million per year would result. If half of that were returned to the field, more complete and effective administration of the mining law would result and rehabilitation of damaged lands could be done on a meaningful scale.

Hopefully, these comments will be useful.

Senator **Bumpers**. He says here,

> There are several reasons why I conclude that the $10 filing fee and associated fee is not realistic in covering the cost of the mining program. Our present costs of administration have little correlation with the actual cost of effective administration. In the situation I am familiar with, our office has one geologist to administer 8,000 claims located in 19 counties. There are hundreds of cases where unnecessary and undue degradation are occurring.
>
> Under conditions currently, we only have the manpower to examine plans of operations, some notices and the most vociferous public complaints.

It goes on and on, and over here he also says on a slightly unrelated subject,

> Filing fees of only a few dollars simply encourage individuals to file frivolous mining claims for purposes which frustrate the intent of the Mining Law. Many of the hundreds of cases of unauthorized occupancy we deal with result from misuse of the Mining Law. For a mere $5, dishonest citizens acquire equity in the public land for purposes unintended under the Mining Law, and all too frequently these bogus claims become a public nuisance or, worse, a threat to public safety* * *.

Et cetera, et cetera.

Now if he has one employee per 8,000 claims, there is no way one person can administer that many claims, is there?

Mr. **Burford**. I may be a little confused as to just exactly what he is saying because we do not inspect every claim, as T.S. stated. That is——

Senator **Bumpers**. I understood Mr. Ary to say you do not inspect any of them. In other words, they send you proof that they have done something on the claim, but you do not go out and check it out, do you?

Mr. **Burford**. No, we do not check it out. Our service charge was just recently raised from $5 for recording the mining claim or for recording the intent to retain, and we made some raises in some other fees at the same time.

Senator **Bumpers**. Well, you did raise it from $5 to $10, I think, Bob.

Mr. **Burford**. Yes, from $5 to $10, and then we agreed to raise some other fees, including the patenting fee, and the total amount of money which we anticipate those fees will bring in is approximately $6 million.

Title V of the Independent Offices Appropriations Act of 1982 gave us the right to keep that money and use it for further enforcement of service regulations. We had to go through a study. We are not allowed to tax. Only you are allowed to tax, so if we decide to raise a fee to $1,000 and it only costs us $25 to process it, we are in the business of taxation and Congress——

Senator **Bumpers**. What are you in the business of when you are spending $24 million and taking in $5 million? Is that called a subsidy?

Mr. **Burford**. No. No, that is not called a subsidy.

Senator **Bumpers**. What is it called?

Mr. **Burford**. I do not know exactly to what you are referring.

Senator **Bumpers**. According to the figures that BLM put out, your revenue last year for all of the administration of this thing was about $5 million.

No, I am sorry. It is even worse than I thought. Your current revenues are $741,940 per year, and according to this memo it costs you about $24 million to administer this program.

Mr. **Burford**. I am not familiar with those figures.

Senator **Bumpers**. This is a memo from BLM, Bob. I am sorry. It is a press release.

I ask unanimous consent that this press release be inserted in the record.

[The information referred to follows:]

BLM

Facts

U.S. DEPARTMENT OF THE INTERIOR - BUREAU OF LAND MANAGEMENT

December 2, 1988 (202) 343-5717

FINAL DEPARTMENT OF THE INTERIOR RULEMAKING: MINING LAW FEE INCREASES

The Interior Department's Bureau of Land Management (BLM) issued a final rulemaking December 2, 1988, that would facilitate greater cost recovery under its mining law administration program by revising certain existing fees and establishing new fees. The rulemaking will become effective January 3, 1989.

The fee changes are being implemented under Title V of the Independent Offices Appropriation Act of 1952. Title V provides that federal agencies should recover costs of program administration for services that provide special benefits to identifiable nonfederal recipients above and beyond those accruing to the public at large.

In Fiscal Year 1987, BLM recorded more than 147,000 new mining claims and processed about 654,000 filings of affidavits for assessment work, as well as recording and processing many other mining-claim-related documents. The rulemaking allows BLM reasonable, although not full, recovery of the costs of program administration.

The increased fees ultimately will generate nearly $4.5 million in additional annual revenues that, when combined with current revenues from existing fees, would make available approximately $5.2 million to be appropriated to BLM for the mining law program.

In order to develop fees that would be equitable to all segments of that community, last spring BLM Director Robert Burford discussed the proposal with many groups, individuals, and Members of Congress. In addition, when the proposed rulemaking was published in the **Federal Register** June 23, 1988, BLM sent 60,000 postcards to notify mining claimants that the rulemaking was available for comment and to ensure that the people most likely to be affected by the rulemaking would have ample opportunity to review it.

BLM delayed issuing the final regulations until December so that they will become effective at the beginning of 1989, rather than right at the end of 1988. Without the delay, people filing affidavits of assessment work in late December would have had to pay a $5-per-claim fee, while people who had filed in November or early December had payed no fee. The delay will also give mining claimants about 9 months to plan for this new fee.

Mining claimants are required by the Mining Law of 1872 to do at least $100 worth of assessment work per claim per year. Most claimants file their affidavits of assessment work with BLM in the late fall or winter each year. The $5-per-claim per-year filing fee would increase the federally imposed component of the cost of maintaining each claim by not more than 5 percent per year.

--MORE--

According to BLM records, approximately 85 percent of federal mining claimants hold 20 or less mining claims. The new $5 fee would amount to no more than $100 per year for these claimants. Because many claimants seeking to make discoveries on their claims are doing more than the minimum $100 annual labor, the impact on their total costs would be much less than 5 percent. An analysis of the processing costs for BLM in Fiscal Year 1987 indicates that each claim for which an affidavit of assessment work (or notice of intent to hold) was filed required an expenditure of $7.42 by BLM.

BLM administers the mineral estate underlying approximately 600 million acres of federal lands, primarily in the West; approximately half of this acreage is prospectively subject to the Mining Law of 1872. Under the Mining Law, a U.S. citizen is entitled to locate a claim on federal lands that are not otherwise withdrawn from mineral entry. The claimant may then explore for minerals and develop any valuable deposits that are discovered. Any activity disturbing more than 5 acres requires submission and approval of a plan of operations.

To obtain these benefits, a claimant must properly maintain the claim by, among other things, complying with the Federal Land Policy and Management Act of 1976. This Act requires recordation of each claim initially, followed by an annual filing of an affidavit that the required amount of assessment work has been done, or a notice that the owner intends to hold the claim.

BLM MINING LAW ADMINISTRATION PROGRAM
FEE CHANGES

Item	Units (1987)	Existing Fees	Current Revenues	Proposed Fees	Expected Annual Revenues
MINING CLAIM RECORDATION:					
-New Claims	147,638	$5	$738,190	$10	$1,476,380
-Annual Filings of Affidavits for Assessment Work	654,000			5	3,270,000
-Transfers of Interest	72,877			5	364,385
-Amendments	4,577			5	22,885
Subtotal					5,133,650
MINERAL PATENTS:					
-New Application	74	25	1,850	250	18,500
-Each Additional Claim in Application	916			50	45,800
Subtotal					64,300
DEFERMENTS OF ASSESSMENT WORK	190	10	1,900	25	4,750
Total			$741,940		$5,202,700

--DOI--

Mr. **Ary**. I think Bob is talking about the cost of recording the data and the affidavits, and it sounds to me like the letter is talking about the full services of the BLM relative to the public land. I do not think those two subjects are the same.

Senator **Bumpers**. Let us just try to get this for the record. I will ask BLM to give me a very detailed schedule of how much you are taking in and the cost of this program, but let me say I believe it is fair to say that you have only about one employee per 8,000 claims——

Senator **McClure**. Mr. Chairman, you say the cost of this program. I, like the witness, am a little confused.

Senator **Bumpers**. I am talking about for the filing of claims.

Senator **McClure**. I think the witness is confused as to which program you are talking about.

Senator **Bumpers**. I am talking about the acceptance of the filing of claims, the acceptance of the annual statements of work or money and so on, the applications for patent, all the things that go with hardrock mining.

Mr. **Burford**. Those fees will bring about $6 million this year. We just recently raised them so we would recover.

Senator **Bumpers**. It is a little under $5 million under your new fee arrangement.

Senator **McClure**. Would you yield for a question on that point? I think you may have missed the fact that he combined two parts. One was the recording of claims and the recording of the affidavits of assessment work, and the other was the work that is associated with patenting.

Mr. **Burford**. Yes. The work that is associated with the filing fee is $10 for a new location, $5 for amendments or transfers of ownership, $5 for annual assessment work per claim, $5 for notice of intention to hold per claim, $25 for petition for deferment of annual assessment work per petition, mineral plant application $250, and filing for more than one claim or site in one patent application $50.

That money is to go into that program. The money that we are presently putting in, we are subsidizing that program now. We are going to use the money that comes in to pay for that and the money that we have been using before for inspection of surface degradation and enforcement of surface laws.

Senator **Bumpers**. Just one second, Senator McClure, and I will turn it over to you.

How many claims are challenged annually by BLM or the Forest Service for lack of compliance with this annual assessment work?

Mr. **Burford**. We do not enforce that.

Senator **Bumpers**. Who does?

Mr. **Burford**. This case has gone to the Supreme Court because the man filed it on the 31st, and the Supreme Court held that since he had not filed it by the 30th he lost his claim to somebody who jumped it.

If I have a valuable claim out there and I do not do my assessment work or file an intent to do it with the Forest Service, Senator McClure can go out and stake that claim, and it then belongs to him.

Senator **Bumpers**. That is not really my question. My question is if I file a claim and say I dug a 10 by 2 foot trench, how many of those claims do you look at to see whether the trench was dug or not?

Mr. **Burford**. We do not look at any of them.

Senator **Bumpers**. You do not know whether any of them are legitimate?

Mr. **Burford**. No, but if that man had a reason for filing it and somebody else knows that he had a reason for filing it, there are people out there who are looking for valuable minerals, and they will put their stake on it and come in and file it with me, and that claim then belongs to them.

Senator **Bumpers**. If he files his annual assessment with you whether he has done the work or not, you cannot top that claim, can you?

Senator **McClure**. Sure.

Mr. **Ary**. You can contest it, yes, sir.

Senator **Bumpers**. You can contest it, that is right; but you are just coming in and saying this guy lied.

Mr. **Ary**. No, I am staking a claim, and I am having him prove he did his assessment work. If he cannot prove he did his assessment work, he loses the claim and I own it.

Senator **McClure**. If I might, I would really like to redirect this a little bit because I think there is a profound misapprehension about what a claim is and is not and what the responsibilities of the agency are or should be, both the Forest Service and the BLM.

We did recently require that the claims be filed with the Federal Land Office. Up until that time they had been filed only in the county in which they were located, and they were recorded under State law, not Federal law.

Mr. **Burford**. FLPMA now says they have to be filed with me.

Senator **McClure**. The State law requires that they be filed with the county, so you have a dual system. But that does not trigger anything. That just says that somebody made a claim, that they have made a discovery. It does not prove anything.

As a matter of fact, you do not have to spend any time and effort monitoring that system at all because at the end immediately following that, others who might wish to locate a claim are in a position to do so, and the Federal Government does not have to spend a dime to get those people involved.

At the end of the system, if that person files a claim, an application for a patent, then they must prove the work that they did as well as the discovery.

Now they do not have to prove it for every year that they were there, and there is no real reason why we should require our government to verify whether those notices are actually valid or not or whether the claim is actually valid or not.

There is under existing law a third aspect which is somewhat different, and that deals with their operations on the public lands during the period of time while they are on the public land. There, you have district managers, and in the Forest Service you have rangers that monitor the activities on the lands within the area of their responsibility, generally speaking.

That includes any mining operations which are active during the period of time that they are monitoring those operations. If there is an active mining operation, you have a whole host of regulations and supervision and so on with respect to the mining operation that takes place.

Let us separate carefully the responsibility or the need of having the Federal Government monitor the claim and assessment work side of it which takes care of itself almost totally without Federal supervision and that which deals with the operations on the land and which there is indeed a very active Federal monitoring presence on both the BLM lands and the Forest Service lands.

I think if I just direct a very general question to the witnesses—do you perceive a need to check the validity of a claim when it is filed?

Mr. BURFORD. No.

Mr. LEONARD. No. I see no need under the scheme that we have developed.

Senator McCLURE. Is there any need for the Federal Government to check the validity of the work that is claimed to be done under notice of assessment work?

Mr. BURFORD. No.

Mr. LEONARD. No.

Senator McCLURE. Do you now monitor the work that is done on the lands under the general supervisory authority vested in your agencies if work is performed on the land?

Mr. BURFORD. If they are proceeding with their plan of operation, we check that to make sure that they are complying with their plan.

Mr. LEONARD. Yes. We require that they file a notice of intent, and if there is any significant surface-disturbing activity to take place, then we require the filing of a plan of operations, and if in the judgment of the local ranger there is going to be significant disturbance, then we will require bonding to ensure rehabilitation of that area.

Senator McCLURE. Until such as time as he applies for a patent, the Federal Government has no title at risk?

Mr. BURFORD. No. If he is digging for quartz, which is completely worthless, we do not care how far he digs that. If he wants to waste his money doing that and then try to come in for a patent and we go out and find there is no demand for the quartz, we will not issue a patent.

Senator McCLURE. If on a claim he sought to convert the claim to a use other than the mining purpose, for instance he started a summer home subdivision, could he do that under existing law?

Mr. BURFORD. No.

Mr. LEONARD. No, he cannot. We would contest that.

Senator McCLURE. I did not mean to take the questioning away from you, Mr. Chairman. I just wanted to get the questions focused on what the real management of the public lands is with relation to the Mining Law, the claim assessment work and patent process which it runs somewhat separate from, and the other question, the management of the surface resources of our land and the protection of the surface resources of our land under a variety of other statutes.

Now Mr. Burford, I think you outlined in your written statement a number of other laws that deal with the management of BLM lands in addition to the mining law.

Mr. **Burford**. Yes. The primary one, of course, is FLPMA and its interaction with the Mining Law of 1872.

Senator **McClure**. So whatever operations that actually take place on a claim are subject to the other statutes?

Mr. **Burford**. Yes, sir.

Senator **McClure**. Is it one or two or a dozen or two dozen other laws?

Mr. **Burford**. I have a list of about, I would say, 200 plus laws that apply to some activity or another on the public lands.

Senator **McClure**. Mr. Leonard?

Mr. **Leonard**. The same body of law essentially applies to the National Forests plus the National Forest Management Act and a few others specific to the national forests.

Senator **McClure**. So the operations on the claim are not just those that are required by the Mining Law, but they are covered by a host of other laws that deal with the effects of those operations?

Mr. **Burford**. The Clear Air Act, the Clean Water Act, all the hazardous waste acts, all of that.

Senator **McClure**. I was just saying to the Chairman I did not mean to take the time away from him. I apologize, but I did want to get into context that the mining operations are not regulated only by the mining statute. They are governed in the main by everything else that we do with respect to public land management, and the Mining Law itself has very little to do with how they operate on the public lands.

Mr. **Burford**. Not any more, not since the passage of FLPMA and the environmental laws of the 1970s. The Mining Law has of necessity taken a second seat and is only procedural and says how you go about staking a claim and how much work you have to do on it and what has to be done to obtain a patent. All of those other laws have to be taken into consideration, as the chart which Congressman Craig had up here showed.

Senator **McClure**. Mr. Leonard, I do not mean to go into detail with respect to the GAO report, but I do want to use one case, if indeed you recall that case, because it is illustrative of the difficulty we have in the impressions created by the GAO report that are not supported by fact.

One of the allegations in the GAO report says that a Federal Agency cannot infringe upon patent holders' property rights, and patent holders deny Federal agencies and recreational users permission to cross their lands.

They refer to one case in the report, and I quote from the report.

> For example, the patent holder of one site we visited near Aspen, Colorado had a locked gate blocking the only access road to considerable Forest Service land and many other mining claims, thus precluding recreational users and miners from crossing his lands to adjoining Forest Service lands.

Are you familiar with that particular case?

Mr. **Leonard**. I have been briefed by staff on that case.

Senator **McClure**. Can you tell me what the facts are with respect to that locked gate?

Mr. **Leonard**. It is my understanding that that was a Forest Service lock on that gate.

Senator McClure. The gate was not because the patent holder, the owner of the land, wanted that road blocked but because the Forest Service wanted that gate locked?

Mr. Leonard. That is my understanding.

Senator McClure. There was, as a matter of fact, two other Jeep roads to back country adjacent to that patent on both sides within a half a mile or a mile or a mile and a half?

Mr. Leonard. Again, staff advises me that yes, there was.

Senator McClure. The reason the Forest Service wanted that gate locked was this road provided access to an area managed by the Forest Service which the Forest Service wanted to manage as a limited access area?

Mr. Leonard. That is correct.

Senator McClure. So instead of being an example that the Mining Law operates to obstruct public access to public lands, this example here was totally on a different subject matter entirely?

Mr. Leonard. That is my understanding, yes, sir.

Senator McClure. How many patents have you had in the last 10 years, patent applications in which the patent applicant was seeking to convert the land to nonmining uses?

Mr. Burford. None in the applications.

Senator Bumpers. You would not entertain an application, would you, for a patent on——

Senator McClure. I am not asking whether they granted it. I am asking how many have they had.

Mr. Leonard. We do not have that information right now. We will look at the records and furnish that for the record.

Senator McClure. If you would, please.

[The information referred to follows:]

We are unable to respond to this question. There is no requirement that a patent applicant provide information on their intended use following the determination that a valid claim exists. It is presumed that the purpose is to mine the mineral deposit. Once the land is patented, we no longer keep any records since it becomes private land. Once patented, the land is treated the same as any other private land and is subject to State and local laws and ordinances. The patent holder is free to mine or make some other use of the land.

Question. Has the BLM ever issued a patent following a validity determination by the Forest Service that the claim was invalid?

Answer. Under the terms of the 1957 Memorandum of Understanding with the BLM, The Forest Service performs any necessary mineral examinations covering National Forest System lands, including mineral exams for patent application. However, the Forest Service only makes recommendations to BLM. It is the responsibility of the Department of the Interior or the courts to determine validity. We are aware of only one instance where the BLM did not take our recommendation. In New Mexico, the Forest Service recommended to patent 6 out of 10 mica claims that the BLM had sent for our examination, and rejected the 4 remaining claims as being invalid. The BLM disagreed with the Forest Service recommendation and completed a separate examination. They determined that the remaining 4 claims were valid and issued patents for all 10 claims.

Senator McClure. Mr. Burford, do you know of instances in which a patent application has been filed where the person filing the application was seeking to convert the land to nonmining uses?

Mr. Burford. I know that there is a case in Arizona which was patented a good many years ago before gravel was taken out from under patentable minerals. That land was patented prior to 1955 when I think that law passed. It made gravel a saleable mineral. That land was patented then, and the man has since mined out all the gravel and then sold the land for part of a golf course.

Senator McClure. But that has absolutely no application to the question of current administration of the Mining Law, does it?

Mr. Burford. No. We are not going to patent the land except for mineral——

Senator McClure. He could not get a patent for common varieties today if he attempted to?

Mr. Burford. No. Congress wisely put that back under least saleable and leasables, and that operates under different law.

Mr. Ary. As a matter of fact, the BLM often uses the Mining Law in the requirements under the patenting act to discourage the abusive attempts to use it for other things.

Senator McClure. Would either of you, Mr. Burford or Mr. Leonard, be able to comment with respect to the possibility that we pass a law or amend the law to provide that the patent when issued would have a reversionary clause so if the land were converted away from mining use that the title would immediately revert to the United States?

Would you have any problem with that, Mr. Burford?

Mr. Burford. The only problem I would have with that, Senator, is I think there should be some kind of a clause in there that that land be inspected by the agency for hazardous materials and the company be made to clean that land up and restore it to a certain specificity as far as HAZMAT is concerned.

As you remember with the R and PP Act, I was getting lands back because of a reverter clause that was giving me a bunch of headaches on HAZMAT.

Senator McClure. I understand that, but aside from the question of the unacceptable condition that you do not want to accept because it would be a real liability to you, you would have no problem with the general rubric?

Mr. Burford. I do not think that I would. I would plead that I would like to study it a little further, but off the top of my head, no.

Senator McClure. Mr. Leonard?

Mr. Leonard. The idea is frankly appealing. Two cautions: One, we are dealing with a very cyclical industry, and we have to deal with the question of when in fact is an operation abandoned or ceases to have those values, because we can have periods when you do not operate for four or five years, and at what point do you determine that it is abandoned.

Senator McClure. My question did not really deal with the abandonment question, and it did not for precisely that reason. I was talking about the conversion to a different use.

Mr. Leonard. Right.

Senator McClure. And then the abandonment or lack of activity——

Mr. Leonard. It would not be an issue if you converted the thing. There would be a question in terms of existing claims as to whether or not you should have a phase-in period for that to become applicable so you avoid the question of a potential taking of an existing right.

Senator McClure. It is very clear that a property owner may have the right to proceed to patent. It is not so clear whether that is a property right subject to the taking question. Is that not correct under existing law?

Mr. Leonard. That would be right.

Mr. Burford. If they convert the pit at Butte to a lake, I suggest we take it back away from them. [Laughter.]

Senator McClure. Mr. Chairman, I have no further questions at this time, but I certainly will want to submit some questions in writing.

Senator Bumpers. Senator Murkowski.

Senator Wallop. Could you yield for a second? If I may, I would like to have inserted in the record an opening statement in what might be called vehement opposition.

Senator Bumpers. Without objection.

Senator Wallop. Thank you, sir.

I have one as well, Mr. Chairman, for Senator Garn, if I may.

Senator Bumpers. Without objection.

Senator Wallop. Thank you for both.

[The prepared statements of Senators Wallop and Garn follow:]

Malcolm Wallop

STATEMENT OF SENATOR WALLOP
GIVEN AT
THE HEARING ON S. 1126 "THE MINING LAW OF 1989"
7 JUNE 1989

MR. CHAIRMAN, I AM VEHEMENTLY OPPOSED TO REPEAL OF THE GENERAL MINING LAW OF 1872.

RECENTLY, HUNDREDS OF WYOMING MINERS SENT ME A PETITION VOICING THEIR OPPOSITION TO S. 1126. TO SUM UP THEIR ARGUMENTS, THEY SAID, "IF IT AIN'T BROKE, DON'T FIX IT."

MR. CHAIRMAN, THE GENERAL MINING LAW OF 1872 "AIN'T BROKE," SO THERE IS NO NEED TO FIX IT.

WHILE THE DISTINGUISHED SENATOR FROM ARKANSAS CLAIMS THAT HIS LEGISLATION IS INTENDED TO "PROMOTE THE EFFICIENT DEVELOPMENT OF FEDERAL MINERAL RESOURCES," THE TRUE INTENT OF THE LEGISLATION IS TO STOP ALL MINING ACTIVITIES ON FEDERAL LAND.

EVEN IF SUCH IS NOT THE CASE, S. 1126 WILL EFFECTIVELY FORCE THE INDIVIDUAL MINER AND THE SMALL MINING COMPANIES OFF FEDERAL LANDS, AND PUT THEM OUT OF BUSINESS.

S. 1126 IS A WOLF IN SHEEP'S CLOTHING. OSTENSIBLY, THE PATENT SYSTEM IS RETAINED, BUT IF YOU LOOK CLOSELY, IT BECOMES READILY APPARENT THAT THE "MINING LAW OF 1989" REALLY PROPOSES A LEASING SYSTEM.

INDEED, "PATENT" AS USED IN THE BILL IS A MISNOMER. A CLAIMANT MAY OBTAIN A "PATENT" TO HARDROCK MINERALS, BUT HIS ALLEGEDLY FEE SIMPLE TITLE IS CIRCUMSCRIBED BY AN 8% OVERRIDING ROYALTY AND A REVERSION AT THE END OF PRODUCTION.

NUMEROUS OTHER PROVISIONS OF S. 1126 WREAK ECONOMIC GENOCIDE ON MINERS:

- TREATMENT OF EXISTING CLAIM HOLDERS-- A CONSTITUTIONAL TAKING.

- DEFINITION OF LOCATABLE LANDS-- EXCLUDES ALL LANDS EVER MENTIONED FOR WILDERNESS DESIGNATION.

- FEES-- EXCESSIVE. FEES ARE IMPOSED ON EVERYTHING FROM RECORDATION TO SURFACE USE TO PATENT "HOLDING."

MR. CHAIRMAN, I COULD GO ON AND ON, BUT I THINK YOU UNDERSTAND MY POINT. MERELY BECAUSE A STATUTE IS OLD DOES NOT MEAN THAT IT MUST BE CHANGED. IN FACT, THE VITALITY OF THE GENERAL MINING LAW OF 1872 IS TESTIMONY TO ITS CONTINUED VALIDITY. I PLEDGE TO DO EVERYTHING IN MY POWER TO PREVENT REPEAL OF THIS VENERABLE LAW.

THANK YOU.

Statement by Senator Jake Garn
to amend the Mining Law of 1872

Mr. Chairman, I am pleased to offer some of my thoughts on the draft measure before us to change the 1872 Act.

First, and foremost, let me say that to small independent miners and to larger mining companies, the proposal before us today is tantamount to a breach of faith by the federal government. It is a breach because it changes the very fundamental rules of the location and claim system which has served this country so well for over 117 years. It violates the promise that if you locate a claim and conduct a viable mining operation, that you can then receive title to that land. This government already violates too many promises and commitments and this is one Senator who is sick and tired of it.

The Mining Law of 1872 has brought America the world's highest standard of living beginning with the industrial revolution up until today. Entrepreneurs have risked their lives savings and sacrificed their all in order to prospect and mine the mineral rich lands of this country. Small miners, (and I mean the mom & pops, the little guys) are the wildcatters who have made this system so valuable.

For those who argue that the law in outdated, I urge them to think again. Think of the billions of dollars of wealth which has been created and subsequently so evenly distributed over the years. Larger Companies have also benefitted from the law, usually after buying out the little guy at a market rate price.

There is nothing wrong with that. In fact, there is nothing wrong with a system that encourages individual incentive. The proposal before us takes away all of those incentives and essentially socializes all the public lands of the great American west. We don't need socialized mining laws, rather, we need to continue with incentives.

For example, the new definition of patenting in the proposed 1989 amendments is a farce. It isn't a patent when the government can simply come in after 15 years and take the land back. The government should honor its commitments, not break them. The diligence requirements as proposed will wipe out the small prospector and assure that only large corporations can engage in the mining business.

Based on the hundreds of phone calls and letters I have received over the past few weeks, I know this is not what the people of Utah want. In rural Utah, thousands of people eke out a living by the revenues they earn from mining their claims.

Mr. Chairman, lets not take away the last hope these people have of making a living by enacting such a radical set of changes. I will oppose this legislation with fervor and believe I am not alone in that conviction. This legislation is not necessary and is an affront to western America and the hard working men and women who earn their living in the mining business. I could go on and on, but in the interest of time will not. Thank you.

Senator **Murkowski**. Is that a vehement statement, too?

Senator **Wallop**. Vehement. I guess it is vehement. There is a phrase in here that says "sick and tired of it". [Laughter.]

Senator **Murkowski**. That is a mild one.

Excuse me, Mr. Chairman.

I am curious to know within the framework of the Bureau of Land Management what your reimbursement mandate is in relationship to your overall cost of doing business. I know that the reimbursement mining law administration fees, you have that source of revenue; but from the standpoint of what your fundamental charge is under your authority, I wonder if you would briefly enunciate.

I know the Forest Service is a multiple use, and I may get into Mr. Leonard as well, but I think there is a perception among some of the committee that your structure to offset your costs in various ways to provide a return to the Federal Government based on the resources you have in control as opposed to the statement that was so eloquently developed by Congressman Craig that it is the wealth of our nation that is derived from the public land.

I wonder if you would care to enunciate. I have been reading the small print, Mr. Burford, and it refers to administration fees and so forth. Could you tell us what your charge is?

Mr. **Burford**. In reference to the fees that we were speaking about, which were the recordation fees and patenting fees on claims, the act under which we set fees says that we have to set a reasonable fee to recover our costs and only our costs. We cannot, for instance, just charge a fee of $1,000 to perform a duty that costs us $10 or $20.

Senator **Murkowski**. In general, is it fair to say that these fees do cover your cost for administering filing and so forth?

Mr. **Burford**. We put a team to work studying and they did time and motion studies, I guess you would call them, to make sure how much time was spent in accepting these checks and filing them and checking it off in there they came up with a figure of $10.30 for one particular part and we rounded it off at $10.

Senator **Murkowski**. Since you have the responsibility for administering and determining in what manner public land will change from the standpoint of its transfer of ownership, why is it not your responsibility to provide the Federal Government with a return equal to the value of what is in the public land?

You can only estimate the value of a mineral prospect, but there is no relationship between the estimate of the Bureau of Mines or the information you have.

My point is I think what I am trying to do here is bridge across a generation or two where the mentality was. The public lands were for the development of the Nation by the people as opposed to why are they not paying their way. I could perhaps focus in on the Forest Service, which I am intimately familiar with as is the Chairman, in relationship between your multiple use concept and why you have a deficit forest.

What has changed? Is this, Mr. Leonard, your charge, or is the charge to make money for the government?

Mr. **Leonard**. In general, we have no charge to make money for the government. In many of our resources such as timber, we have a charge to get fair market value for the material that we are selling or a use that we would make of the forest lands, but that is not tied to the cost of our administration.

Senator MURKOWSKI. So the other things that the public agencies do, whether it is to make recreational lands available or monitoring them for the public, are not related to a return from what the land produces? This is just part of your agency budgetary process?

Mr. LEONARD. That is correct.

Senator MURKOWSKI. Why have we not been able to convey this responsibility to the mentality of the American public?

Mr. LEONARD. I wish I could answer that.

Mr. BURFORD. I do not remember whether it came before your committee or not, but the National Park Service did get the authority to charge these in some of their areas, and it produced some heat, more heat than it did light. They did get it through.

I suggested to the Assistant Director for Fish, Wildlife and Parks that he put BLM recreation areas in there at the same time, and he slapped me away saying he was having enough trouble without my hanging on his coattails.

Senator MCCLURE. Would you yield for a question?

Is it not also fair to say that even though the Park Service increased the fees and generated more revenue for the administration of those parks where were they generated, it does not cover the cost of operating the parks?

Mr. BURFORD. No, it does not cover the cost of operations.

Senator MCCLURE. That, too, is a money loser for the government.

Mr. BURFORD. There is one program which is certainly a money maker for the government, the oil and gas leasing program.

Senator MCCLURE. Let us keep the oil and gas program and close down the parks, then. Is that what I am hearing?

Mr. BURFORD. I do not think I better make that statement.

Senator MURKOWSKI. I think it points out a fair evaluation. The value of wilderness means many different things on the interpretation of value, whether you look at Forest Service lands or BLM lands or wilderness land.

We have to look at the reality that they are all lands, but the equity, why not pay for wilderness? We are not structured that way. You could take buy areas and put them into wilderness, but when they are public lands already and you take them out of a multiple use concept and put them in wilderness, it costs, and it is a classification that provides a use for those who use them, but it also is a detraction from the standpoint of what value that land had for the wealth of the Nation.

Mr. Chairman, I only point this out to give the evaluation in the broad sense that when you deal with public land and make designations, there are many, many considerations. I think as we reflect on the charge of these agencies 100 plus years ago and the fact that we are reflecting on it now, their responsibility really has not changed very much.

If we initiate substantial changes, why then we have to look at the merits of the wilderness areas as well and the cost of those for the benefit of our Nation.

Would you care to add anything to that?

Mr. **Burford**. I would say we are required by the Wilderness Act to have a geologic report from Mr. Ary's Bureau of Mines and/or the USGS as to the potential of energy and minerals in those areas when we send them up to you people to make your decisions on it.

I am sure that TS will agree with me that neither he nor the USGS can put a dollar value on any of those particular wilderness areas. All he can discuss is a probability factor such as in the California Desert. It is probably one of the most highly mineralized areas in the Lower 48.

Your state has the ANWR controversy going on now as well as the National Petroleum Reserve. The National Petroleum Reserve, from all that is known about it—and very little is known—is also probably one of the greatest mineral belts. It starts at the Red Dog, which may be the largest concentration of lead zinc ore in the world. It has never been completely drilled out because I think the owners of the company were afraid the reserve tax might be passed by the legislature.

I walked the edge of the drilled holes, and there is ore beyond where the drills stop. There is 50 years of production at that particular site, and that is not the only site that is known about in that belt which goes right up across the National Petroleum Reserve.

Senator **Murkowski**. I would conclude by indicating to the Chairman for his benefit and reflection as we reflect on the levels of government during the 10 town hall meetings that I held last week while I was in Alaska, in those communities that were affected by the oil spill it was kind of interesting to note that our state spent about $975,000 regulating the oil industry, and we spent a little over $2 million regulating and putting the placer mining industry virtually out of business.

So as we reflect on our changing priorities, Mr. Chairman, why regulation just does not exist at a Federal level. It is all through government.

Thank you, Mr. Chairman.

Senator **Bumpers**. Mr. Burford, just a couple of quick ones.

Do you think that oil and gas is important to the national security of this country?

Mr. **Burford**. Yes, sir.

Senator **Bumpers**. How do you distinguish between this law and the law under which we lease lands for oil and gas exploration on a competitive basis and reap huge benefits from the oil and gas companies, and they do not even know whether they are going to find anything? If they do find something, we are going to take 12.5 percent of it.

I submit, as you would agree, that oil and gas is much more important to our national security. How do you distinguish between the two?

Mr. **Burford**. It is much harder to find.

Senator **Bumpers**. The minerals are?

Mr. **Burford**. The minerals are much harder to find.

Senator **Bumpers**. But we are charging them nothing to look.

Mr. **Burford**. If you get into a leasing situation——

Senator **Bumpers**. My bill is not a leasing situation. It allows essentially the same kind of patenting process we have right now except you patent the minerals, not the land. If you patent the minerals and not the land, then the government does not have to worry about whether people are going to mine or not.

There is one thing they cannot do. They cannot go out and sell this property for some kind of a big fancy price.

Mr. **BURFORD**. I must apologize to the Senator because I have not been able to study your bill. As you know, it——

Senator **BUMPERS**. It is not a leasing system. I am just asking why we make this distinction between oil and gas and charge people huge sums to go out and look for something they may not even find?

Mr. **BURFORD**. I think the production of minerals is a much more expensive process, and there is a straight line where you will put more and more people out of business in the minerals business than you would in the oil and gas business. We have seen a lot of people go out of businesses in that.

Senator **BUMPERS**. A lot of people have gone out of the oil and gas business in the last few years, too.

Mr. **BURFORD**. That is correct.

Senator **MCCLURE**. Could I ask that Mr. Ary answer that question? That is an excellent question.

Mr. **ARY**. I would like to thank the Senator for his comments that he is not pushing for a leasing bill, because we have looked at leasing and how it might affect the hard minerals operation. It has not worked in the minerals area very well, and we do not think it will. It was very comforting to hear you say you are not pushing a leasing bill.

The geology of the Leasing Act minerals is very different from the hardrock minerals. The coal, oil and gas, potash and salt are generally bedded deposits, and they are generally pretty consistent in their makeup and grade and thickness. So you can go out and develop and find these large bedded deposits by drilling holes at half-mile to quarter-mile centers.

On the hardrock minerals, it is a different story. They are very erratic in nature. They are small generally. They are higher grade deposits, and some of the deposits need to be drilled out on 25-foot centers, which is a much more risky bit. In general, most deposits you can drill out on 100-foot centers. So the risk that you are taking to go out and develop hard minerals is so much different from what it is under the Leasing Act.

Once you get into an oil and gas area, a known reservoir, you can go out and do a lot of surface activity on group chutes and things like that and determine the favorability of a large area. So then you have something in order to go look at a competitive bid. A lot of people can participate in that group chute and each one evaluates their own position, and you have some competitive bid arrangement. You cannot do that in the mining business because once you drill your hole to find out if there is an ore there, if you share that information everybody knows exactly what the grade is and the tonnage, and so you are not going to participate and allow people to participate with you in the drilling of those holes.

So it is a matter of risk and the manner in which the ores are located.

Senator BUMPERS. Mr. Ary, the mining industry leases a lot of private land and pays a rather handsome royalty on it.

Mr. ARY. I am not so certain about the handsome royalties.

Senator BUMPERS. What would be handsome, and what would not be handsome?

Mr. ARY. A 10 percent royalty to me is handsome. I have leased an awful lot of land in private practice for 2.5 to 5 percent. I have leased some at——

Senator BUMPERS. Would you favor my bill if I would cut the royalty to 2.5 to 5 percent?

Mr. ARY. I do not think that the royalty is the sticker. The mining industry needs about four requirements for their self-initiation program. They need a nonexclusive right to go out on the public lands and to prospect and to make a discovery. Once that discovery is made and a claim is located—and you do not have a valid claim until you make that discovery—then they need a exclusive right from that point on to develop that claim and to mine it. They need a security of tenure during that period of time so that they can mine this to completion, and they also need the right to use as much of the surface as necessary for the mining operation.

Those are the four things that we need in the mining business. The rest of this is old law. It is fuel for the status quo. It is fuel for the environmentalist. It is fuel for those who are not anxious to have the 1872 Act in business.

So we do not need all of these things, but we do need these four items.

Senator BUMPERS. Mr. Ary, thank you.

Stewart Udall has to catch a plane here in a minute, so I am going to move on.

We can submit our questions for the record, with your indulgence. Thank you all very much for being here.

Our second panel today is Mr. Stewart Udall, Chairman of the Mineral Policy Center. He is accompanied by Mr. Philip Hocker; Mr. David W. Delcour, Vice President, AMAX Mineral Resources in Denver, Chairman of the Public Lands Committee; Mr. Geoffrey Snow, President of Minerals Exploration Coalition, Lakewood, Colorado; and Mr. Michael McCloskey, Chairman of the Sierra Club. I guess that is it.

We want your full statements entered in the record, and if you can extemporize on your testimony it will be most welcomed also. Since Mr. Udall is under the greatest pressure and his name is number one on my list, Stewart, please commence.

Could we have order in the committee room, please?

Mr. Udall, please proceed.

STATEMENT OF STEWART L. UDALL, CHAIRMAN, MINERAL POLICY CENTER, ACCOMPANIED BY PHILIP M. HOCKER, PRESIDENT

Mr. UDALL. Thank you, Mr. Chairman. I appreciate the opportunity to be here today and back in this room that I spent so many hours. I guess I want to use my five minutes to kind of give a little historical perspective and maybe an opinion or two.

Some of us oldtimers thought that the time was right to have significant modification of the 1872 Act, and we formed a little organization that is new, it is tiny, called the Minerals Policy Center. We are here today, Senator, to support your legislation and perhaps even hope that it might go even further.

I want to make a couple of points. 20 years ago when I left office, I and my people identified two major environmental problems. One was the modification of the 1872 Mining Law. Another was the surface mining that was taking place with the coal leases that were leased on Federal lands. Of course, that led to a 10-year fight that my brother led with the help of some of the people in the Senate.

At that time I remember the coal industry said it would put them out of business and it would be very disruptive to the coal industry, and it did not happen.

The second point I want to make is that this struggle, argument, over the 1872 Mining Law has not been east-west, and it has not been partisan. The only reason I could not propose anything in office was I had an agreement with Mr. Aspinal that we would not propose legislation while the Public Land Law Review Commission was doing its work.

Secretary Rogers Morton in 1972 proposed a leasing bill. It would be interesting to you to go back and look at it. It was a tough bill. This was the Nixon Administration. Subsequent to that, the last effort that was made, as I am sure the members of the committee know, was when Scoop Jackson and my brother made an aborted effort about 10 or 12 years ago.

My point is that Scoop Jackson, Mo Udall and myself, Rogers Morton, John Sailor, some of these other old figures, many of them gone now, are westerners. It has not been east-west, and it has not been Republican-Democrat. I just want to make that point historically.

I have always respected the Idaho people. I have always fought a strong fight on this issue with them and some other people from western states; but even Senator McClure admits that maybe there should be improvements.

I think it is time, because I think this act does stand out. The Homestead Act is long gone, Mr. Chairman, and this act is one that does not fit modern times. I was sitting here today listening and wondering to myself how much minerals are located today with a pick and a shovel.

I know a lot about copper. I know a lot about uranium down in our area. It is all found with what we would call high tech mining methods. I think that is an area of inquiry, whether the old system where the individual prospector and so on really fits, aside from the environmental concerns that I have.

It has always struck many of us that this act was, as you, Mr. Chairman, have stressed today, was kind of a free lunch. It is the only one left in public resources owned by all of the people where a significant charge is not made.

These are the main points that I wanted to make here today. I think it is time for reform. I think we need a strong mining industry. The mining industry, Senator McClure, has shown a lot of resilience. The copper industry has in my part of the world in the last few years. I believe they can adjust to some changes that would make this more fair, more just and more environmentally sound. That is essentially the message that I wanted to convey to you.

Mr. Hocker, who is the president of our organization, will present the details.

Senator BUMPERS. Mr. Hocker.

STATEMENT OF PHILIP M. HOCKER, PRESIDENT, MINERAL POLICY CENTER

Mr. HOCKER. Thank you, Mr. Chairman. I appreciate the opportunity to testify today.

Mr. Chairman, I would like to just respond for a moment to some of the things that have been said earlier today, and then I will make a few detailed points. Obviously, our testimony includes more than I can say orally today.

Mr. Chairman, we refer to the 1872 Mining Law as a law with no brain simply because it does not permit any intelligent evaluation of whether an accident of geology represents the best use of the land. You have alluded to that before.

I think the best feature of your bill from our point of view is that it includes not simply an end to the surface patenting provisions and not simply the provision of a fair royalty on mineral production from public lands, but it also permits a process for integrating mineral decisions with other multiple use decisions on the public lands.

That does not happen today, and despite Congressman Craig's extensive chart, I think you went to the heart of the issue on his chart, which is where the box is that says that the government can say no. There is no such box, and the history of the administration of the 1872 Mining Law verifies that.

I am not sure if we can do this today but it might be an interesting experiment, but one way you might test that would be to ask the folks who are going to testify as the day wears on whether each of them feels that the position of a valid claim—and I mean valid in the term of having had the discovery test successfully met—gives them a right to mine the deposit.

I think you will find that each of the mining industry folks feels that ownership of a valid claim where a valuable deposit has been discovered gives them a right to mine, no matter what the other costs to the public domain. They may have to comply with many types of regulation. They have to meet both the Clean Water Act, the Clean Air Act and also the Social Security Act regulations, but they nonetheless feel that they will have a valid right to mine.

Since this is a legislative hearing, we have a few comments on your bill which we support. We believe it does need some strengthening amendments.

Also, though, we feel there are a few places where the bill is perhaps a little more restrictive on the mining industry than is necessary to achieve the larger public policy goals that we think we are all after here.

We would propose that prospecting which does not involve significant surface disturbance be permitted without notice. Your bill calls for a notice. I understand the motive of that, but I think that it will be difficult to enforce. It may tend to deter——

Senator **Bumpers**. If I may interrupt, it was my intention to allow prospecting without a permit unless there is going to be surface disturbance, in which case there would be a requirement. If it does not do that, then we will fix it.

Mr. **Hocker**. Thank you, Senator. I read it to not require a permit but to require notice.

I think the main point that I should probably focus on in what remains is the reclamation provisions. We believe that the provisions for mining and reclamation plans in the bill contain many good features. We would suggest, however, the addition of identification of rights-of-way, hydrologic and acid drainage generation potential, and the identification of the productive post-mining land use which is intended for the site after mining is completed.

Also, we believe that the requirements in the bill that a proposed mining and reclamation plan shall be approved if it meets existing law and regulation needs to be rethought in the detail of that wording, and the provision that a further public interest test beyond simply the conformance with existing law and regulation is required. We think that this is really going to be the crucial step.

I think that the application of that judgment by public land managers should be directed, in the final language of the bill, so that we do not have arbitrary and capricious decisions being made, but maintenance of that discretionary test and placing the responsibility for that test on an informed land manager is the crux of mining law reform.

Thank you.

[The prepared statement of Messrs. Udall and Hocker follows:]

MINERAL POLICY CENTER

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Statement of Stewart L. Udall,
Chairman, Mineral Policy Center

and

Philip M. Hocker,
President, Mineral Policy Center

Before the

Subcommittee on Mineral Resources
Development and Production
of the
Committee on Energy and Natural Resources,
United States Senate

on the proposed Mining Law of 1989

7 June, 1989

Mr. Udall:

Mr. Chairman, members of the Committee: I am Stewart L. Udall. I am an author and attorney in Phoenix, Arizona. For eight years, from 1961 to 1969, I served Presidents Kennedy and Johnson as Secretary of the Interior.

I am testifying today, at the committee's invitation, as Chairman of the Mineral Policy Center. With me is Philip M. Hocker, the President of the Center. We are a national non-profit organization, based in Washington, D.C., working for improved environmental regulation of mineral development, including hardrock mining and oil/gas exploration and production. We provide information and assistance on mining issues to concerned elements of the mining industry and to scores of local citizens' organizations around the Nation. Reform of the 1872 Mining Law is our top priority.

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As a native Arizonan, mining is a familiar activity to me. Mining is an important part of the heritage and economy of the American West. A sound mining industry is important to the Nation. However, a sound American mining industry can and must exist within the same consensus of environmental rules and responsibilities which govern other industries, whether on public or on private lands.

During my eight-year tenure as Secretary of the Interior, I reached the conclusion that the most important piece of unfinished business on the Nation's natural resource agenda was the complete replacement of the Mining Law of 1872. I transmitted that conclusion to the Public Land Law Review Commission in January, 1969. However, it is sadly ironic that the great progress which has been made through the passage of legislation such as the Federal Land Policy and Management Act of 1976, and the National Forest Management Act, has not affected mining's extraordinary position outside the framework of multiple-use management of our public lands. Those bills have in general skirted around mining issues. So the need for Mining Law reform is even more glaring now than it was in 1969.

Mining creates major impacts to America's environment. It generates twice as much hazardous waste each year as all other industrial activity and municipal landfills combined. The State of Oklahoma has identified mining in the Picher Field region as its worst pollution problem. The largest Superfund cleanup site in the Nation is the result of mining in Montana.

While the mining industry has abandoned many of the damaging practices of its past, much continues today which threatens groundwater and surface streams for tomorrow. The EPA has determined that the long-term environmental safety of many mining activities is a function of the site itself, and not merely of good or bad practices. Simply put, some locations cannot be mined without creating permanent environmental damage. Yet, the 1872 Mining Law guarantees a "right" to mine any discovered ore, with no weighing of mining benefits against environmental costs. This must stop.

Therefore, I am very pleased to testify today in support of Senator Bumpers' "Mining Law of 1989." While the Mineral Policy Center believes that some strengthening amendments are essential to craft a sound new Mining Law from this bill, we applaud it as a rock-solid beginning. We applaud this Subcommittee, and particularly Senator Bumpers, for the statesmanship and initiative which this bill represents.

The need for Mining Law reform has had bipartisan recognition in the past. Four years after my statements in 1969, Interior Secretary Rogers Morton had the Mineral Leasing Act of 1973 introduced. It would have unified Federal mineral administration and replaced the location-patent system for hardrock minerals with a leasing system.

The "Mining Law of 1989" does not go so far as Secretary Morton's bill would have done. It retains the location system, combined with a patent which contains new conditions to protect the environment and the public interest. This does forego some of the protections which a leasing system would obtain for the public and the Treasury. For example, in cases where the Geological Survey has located promising mineral areas before the prospectors, the Federal investment in research could be protected with a leasing system. With the provisions of this bill, the public obtains no more return where it has paid to determine the mineral potential of an area than where it has not.

If the concession of retaining a location-patent system instead of a leasing system must be made, it should be recognized as such. This bill should, then, be strengthened in several ways to achieve its noble purpose of bringing the Federal management of mining on the public lands into the twentieth century. The President of the Mineral Policy Center, Philip M. Hocker, will give our specific recommendations:

Mr. Hocker:

Mr. Chairman, thank you for the invitation to testify today. My comments will be directed to a number of substantive changes which the Mineral

Policy Center believes need to be made for the "Mining Law of 1989" to perform its intent. Some additional technical suggestions will be submitted in later correspondence.

Concepts:
The Mineral Policy Center supports a reformed Mining Law which is clear and easy to enforce, one which provides predictable and reliable protection for the environment, for other multiple-use values on public lands, and for the public purse. We believe that the core of American mineral policy should be the concept that private enterprise shall be encouraged to explore for and develop the Nation's minerals, subject simply to the levy of a fair return to the public for its value and the regulation of mining activity to prevent environmental damage.

To encourage mineral exploration and development, a reformed Mining Law should provide security of tenure for true exploration and mining, but should clear the land of merely idle claims as quickly as practicable to open it to new exploration.

We also believe that public participation in these processes is vital if they are to be effective and durable. Avenues for public involvement in decisions and provision for the of public's legal standing to enforce protections is essential.

Scope of this Bill:
Two clarifications to the scope of application of this legislation are needed. The definition of hardrock minerals in Section 102(e) should be clarified by addressing the problem of definition of "common varieties" of certain salable stone materials. We would endorse the simple deletion of the words "common varieties" from 30 USC 601. As to the land to be defined as "locatable," we endorse the concept of protecting lands proposed for Wilderness designation from mineral location pending resolution of their status. This step is badly needed to prevent the steady loss of dwindling Wilderness resources, as is immediately threatened on a number of BLM Wilderness Study Areas in Oregon and Nevada.

Roles of the Agencies:
The roles of the different agencies involved in administering public resources under this bill could

be more clearly stated. We urge you to revise with this goal in mind: that, as much as possible, administration of mineral projects, including the recording of claims, permits, and patents, should be concentrated in the agency with primary surface-management responsibility. This should apply to the U.S. Forest Service, the National Park Service, and the Fish and Wildlife Service, and perhaps others.

Administration of royalties themselves should be concentrated in the Minerals Management Service.

The general goal of "integrated multiple-use management" for our publicly-owned lands cannot be achieved if minerals are treated as the extraordinary fiefdom of one Department and agency -the Bureau of Land Management. The special technical requirements for review of mining projects are not so much more demanding than those for review of other resource development activities by the standards of today. There is no need to repeat the "separate but unequal" structure which exists today for oil and gas management activities, by the provisions we adopt for hardrock mining.

Prospecting:

Prospecting which does not involve significant surface disturbance should be permitted without notice. The notification requirement in the prospecting section of the bill will be difficult to enforce, and creates a deterrent both to incidental prospecting and to organized mineral surveys. A mining company conducting surveys could fear that information from its required notice would spur claim location by speculators. Overall, the notification requirement in this section is unneeded and should be deleted.

Exploration Claims:

The method of "location" of claims is not stated clearly in the bill. We recommend that claims be simply "recorded" with the surface managing agency, and not "located" on the ground. The process of driving stakes into the ground on the perimeter of each claim is an unnecessary relic of the past.

Recordation should establish and be the sole evidence of title to the claim. Assignments and leases of claims should be permitted, but should be effective only when formally recorded with the Federal agency with which the original claim was recorded.

The minimum claim size should be 40 acres. This is still a tiny unit within many modern mines, and doubling the size from 20 to 40 reduces the administrative workload by 50%. 40 acres is a more realistic minimum area for much mining today, although of course almost every mine which has any economic significance will be well over that area.

The requirement that the specific mineral which the claim is intended to cover be identified will be difficult to enforce and probably serves no practical purpose. In effect, most claimants will probably fill this blank on the form with the periodic table of all the elements.

The provision restricting the use of claims to "mineral exploration" will be helpful in reducing the abuse of claims for non-mining purposes. However, it should also provide that no structure of any kind may be erected or placed on a claim except as approved by the surface managing agency pursuant to an approved exploration plan. This tight provision is needed to eliminate squatting on Federal lands under the cloak that the occupancy is for "mineral exploration," a claim historically difficult to resolve.

Term of Claims:

Several provisions located around the bill affect the time period over which a claim may endure. These should be collected in a single section.

The provision that disapproval of an exploration plan voids a claim will tend to discourage the submission of plans. Other provisions for terminating pointless claims should be considered, but this feature which voids a claim simply because an exploration plan was denied should be deleted.

As written, the bill would terminate all claims which had no patent application filed at the end of ten years. Ten years is too long to permit land to be tied up prior to even filing an application for patent. Note that this is not a requirement that mining commence within ten years, but simply that some action indicating a sincere intent to mine be taken. Five years is a reasonable time period for this. However, rather than impose a "drop-dead" time limit, which will inevitably raise a call for extensions and suspensions, we suggest considering a very steeply rising fee rate after five years - say doubling annually.

Mineral Patents"
The term "patent" is defined (Webster's 2nd International Dictionary) as "letters patent; an official document, esp. one issued by a sovereign power, conferring a right or privilege on some person or party." The use of the term "patent" in this bill is well within its established range, and we support it.

The use of the term "capable of commercial development" as a condition for patent issuance places the Government in the position of evaluating market values, counter to the trend of recent mineral legislation such as the abolition of the Known Geologic Structure in oil leasing. This test appears to play the same role as the "discovery" test in existing law, a test which has had a complex and litigious history.

We recommend abandoning this "discovery test," and replacing it with a clearer requirement that, after all other conditions of law and regulation have been met, the surface managing agency determines that approval of the proposed mining operation is in the public interest. As defined in this bill, the "capable of commercial development" test may be more lenient than the historic "discovery" test. For example, it is established that a deposit under the 1872 Mining Law must be "valuable" even when compliance with environmental regulation is taken into account. Would such a requirement apply for a deposit to be "capable of commercial deposit?"

The roles of the dual (or dueling) Secretaries are imprecise here (e.g. p.9, line 17). We support a process which makes each surface managing agency responsible for review and issuance of patents on its land.

Royalties:
The eight per centum royalty proposed in this bill is too low. A minimum royalty of twelve and one-half per centum of the gross value of production should be imposed, in line with OCS leasing, and the Secretary of the Interior should be empowered to

increase the royalty level on a mineral-specific basis if conditions warrant. Provisions should be included for review of all royalty levels, with adjustments to be imposed on existing patents, at five-year intervals. The future revenue from mineral production should not be locked in today - nor should today's administrators be impelled to set unseasonably high levels to anticipate the future.

Term: the purpose of patent should be production, not speculation. A patent should not endure more than five years beyond termination of mining; fifteen years, as proposed in the bill, is far too long. Note that a "market conditions" proviso has been made in addition to this five year shutdown provision. As with claims, a steeply rising fee should be considered in place of the "drop-dead" date.

Mining and Reclamation Plan:

The mining and reclamation provisions contain many good features. Among the additions we would recommend are: identification of rights-of-way; description of hydrologic conditions and potential impacts on groundwater, field-scale testing for acid-generation potential of all disturbed materials (waste, ore, and tails), and an identification of the productive post-mining land use which is intended for the site.

The provisions for review and approval of plans for mining operations and reclamation are crucial to protection of the environment under this bill. While the mining and reclamation plan is made a prerequisite for a patent, the term and conditions of the plan should be independent of the term of the patent.

If mining is not commenced under an approved plan within three years, the plan should expire and no mining should be allowed until a new plan is submitted and approved, regardless of the term of the underlying patent. Provision should be made for orderly renewal of mining plans. Modification should be made to mining plans at the direction of the managing agency when justified by changing circumstances or new information.

In addition, more extensive reclamation provisions are needed to address a variety of conditions.

Surface restoration to "approximate original contour" should be required in most cases, although an exception may be allowed in the case of large pit excavations. Small pits, equipment areas, and roads should be restored to original contour.

No mining should be approved where it will result in long-term acid drainage or other water or air contamination problems. To be acceptable, a reclamation plan must demonstrate that it will lead to a stable, permanent, benign, useful condition for the site after closure.

Diligence:
Historically, "diligence" fees amounted to about a month's labor at prevailing rates. The intent, as stated above, should be to permit a serious miner - either large corporate or small individual - to hold a claim by seriously working on it. The annual fee should be $100 per acre per year - a reasonable test of seriousness to hold the land.

Diligence payments should be taken as simple fee payments, unless approved geologic evaluation work is done. In that case, the miner should be permitted to take a credit against his fee to the Treasury if he submits the geologic information which has resulted from the credited work to the Government. Regulations should be established to test both scientific value and cost. Geologic data developed through diligence work should be permitted to be held confidential at the claimant's request for up to seven years, after which time it should be open-filed with the US Geological Survey.

These suggestions would eliminate the problem of policing "recreational bulldozing" under the guise of mineral exploration. Because no credit would be permitted against the cash payment of a diligence fee except where true geologic data resulted, and because the cash payment would suffice to hold the claim, all sides would benefit.

Disposition of Receipts:
Hardrock mining has been the cause of major impacts to the Nation's environment; new mining, even with the best of care, will still entail inevitable loss of wildlife habitat, scenic beauty, and recreation lands. It is only reasonable to dedicate

the royalties collected on hardrock mineral production to repairing some of this damage.

Estimates of the yield from a hardrock royalty vary, but $500 million dollars per year may be a good starting point for a 12.5% levy. With half going to the states, the Mineral Policy Center recommends that the remainder, up to an annual cap of $50 million, be dedicated to a Hardrock Mine Reclamation Fund. The principal and interest in this fund would be expended to reclaim hardrock mining sites.

The General Accounting Office has estimated (in RCED-88-123BR) that over 280,000 acres of abandoned mine lands in Western states need reclamation at an estimated cost of $284 million. We believe the GAO has failed to account for the higher costs of solving waste water and groundwater problems, and that the true figure is at least double their estimate. An annual program of $50 million would provide for the resolution of these problems within approximately ten years.

Provisions for terminating the fund should be included. However, almost one-fifth of the reclamation need identified by GAO was for activities occurring after BLM and USFS had implemented new reclamation regulations, so we should not automatically assume that all reclamation problems will go away after the passage of this bill.

The remaining revenue should be dedicated to the Land and Water Conservation Fund, or its proposed successor the American Heritage Trust.

Enforcement Provisions:

Additional enforcement provisions which should be added to the Mining Act of 1989 to make it a strong protector of sound mining and the public trust include:

Citizens' Suit Provision: A section should be added to the bill explicitly authorizing the right of citizens to commence civil actions to compel compliance with the law. This type of provision is an integral part of the Surface Mining Control and Reclamation Act (30 USC § 1270), of the Clean Air Act (42 USC § 7604), and of the Federal Water Pollution Control Act (33 USC § 1365). It has greatly improved the enforcement of environmental protection during times of laggard agency policy; given the history of mining administration, the need is clear.

No Permit or Patent to Violators: A provision should be included to provide that no exploration plan or mining and reclamation plan shall be approved for, and no mineral patent shall be issued to, any person, association, corporation, or any subsidiary, affiliate, or person controlled by or under common control with such person, association, or corporation, during an period in which such entity has failed or refused to imply in any material respect with the reclamation requirements established under this Act for any prior mining operation to which such requirements applied.

This provision will be a powerful incentive to force diligent cleanup. Similar provisions already exist in the Surface Mining Control and Reclamation Act and in the Federal Onshore Oil and Gas Leasing Reform Act, among others. See attached Great Falls Tribune article, "After the gold work," for an example of the need for this authority.

Additionally, we support the inclusion of a further group of enforcement provisions, including penalties, fines, and imprisonment for violation of the reformed mining law.

Transition Provisions:

The prohibition on any further patenting of claims under the 1872 Mining Law is crucially important. For example, 2016 unpatented claims now exist within units of the National Park System. If these are permitted to go to patent, the Park Service estimates that roughly one-fourth of them will be found to be valid. This means that 504 new twenty-acre inholdings, which can be used for any purpose, could be created in the Park System through the patenting terms of the 1872 Mining Law unless prevented.

This year, about $1.6 billion worth of gold will be mined from unpatented claim land in Nevada; one company, Echo Bay Mines, controls "about 125 square miles" on their "claim block" (1988 Annual Report). If a cutoff of surface patenting is not implemented immediately, these valuable public properties will slide into private, often foreign corporate, ownership.

In 1981, the U.S. Court of Claims sustained a previous legislative ban on Mining Law patenting, in Andrew L. Freese, 2d, v. U.S., 639 F.2d 754. Since the claimant still has an opportunity to mine the claimed mineral, even under new regulations, no "taking" obligation is created by terminating the opportunity to patent lands.

The bill creates a "two-tier" system of claims for the indefinite future. We see no need for this. After a reasonable period - say one year from date of enactment, the final bill should provide for termination of all claims not reapplied for under the new law.

With mining as with taxes, the government is under no obligation to give anything away in the future, simply because it did so in the past.

Conclusion:

On behalf of our own members, and of the over seventy local grassroots citizens groups we assist who are concerned with the environmental impacts of mining, we applaud the "Mining Law of 1989." We urge the Subcommittee to adopt the strengthening amendments we have suggested, to make it an even better tool.

The older hands in the mining industry have grown accustomed to the 1872 Mining Law, and of course will be reluctant to see it changed. But there are new faces and more environmentally-aware folks in the industry, though they may not be in positions to testify before you today. Reform of the Mining Law will not be a detriment to the serious provision of mineral supplies for the Nation; rather, by ending the legal isolation of mining as a "special case" overriding the multiple-use consensus on our public lands, reform will do the industry, as well as the public, a great service.

We thank you for the opportunity to testify before you today. We urge you to persevere.

Attachments:

"After the gold work," Great Falls Tribune, 20 June 1988.

Photograph of acid mine drainage, Fisher Creek, Montana.

Great Falls TRIBUNE, June 20, 1988
Great Falls, Montana

After the gold work

Miner, state at odds over cleanup of old gold site

By STEVE SHIRLEY
Tribune Capitol Bureau

HELENA — On a mountainside 20 miles southwest of Helena, dilapidated buildings stand guard over the Nellie Grant Mine site. A small stream gushes from a fissure inside a building where gold, silver and lead ore once were crushed.

The stream shoots through the collapsing building and flows down the hillside to beaver ponds below in Lump Gulch. Its path is marked by a bright orange residue left by metals in the water.

The stream flows past a tailings dump surrounded by walls of bulldozed dirt.

The scene underscores the concerns of state and federal officials, who worry that water is leaching heavy metals from the site and washing them into Lump Gulch Creek.

> "It is the company's policy to do the best job of reclamation as is reasonably possible."
>
> B. Dale Fayram

"There's a tremendous remaining problem," said Kevin Keenan of the Health Department's Water Quality Bureau. "It's just a matter of time and it's all going to come down the hill. It would take tens of thousands of dollars to fix the damage."

That damage will have to be paid for by taxpayers, as the Canadian-based company that mined the site, Sparrow Resources Ltd., folded in 1982. Bonds posted by the company were not adequate to cover all reclamation costs. Sparrow also left behind a quarter-million dollars' worth of unpaid fines levied for water-quality violations.

But the Nellie Grant is not all that worries state and federal officials. Sparrow's founder, B. Dale Fayram, is attempting to expand another mine near Rock Creek, a prime trout stream east of Missoula.

The gold and sapphire mine is located in Quartz Gulch, about 40 miles south of the stream's mouth.

The mining operation already has encountered trouble. In March, the state Health Department sued Fayram and his companies, American Eagle Mining, and Questor Mining and Equipment, for violating the state's water-quality act.

In February, the Department of State Lands rebuffed his request for a permit to expand the mine, calling the application "grossly deficient."

And the Forest Service said Fayram could not do any more mining at the site until he increased his bond from $3,200 to $15,200.

In an interview last week, Fayram charged that government officials are trying to block his mine because of political pressure from the Rock Creek Advisory Council, a group he said wants to stop mining in the drainage. He threatened to sue the state to force it to let him proceed.

State officials deny his charge, but say they are keeping a close eye on Quartz Gulch because of their bad experience with the Nellie Grant.

Fayram said he was not responsible for the problems at the Nellie Grant. He said he resigned as Sparrow's president and board chairman almost a year before the company folded. He also said it was not his fault if the state did not require adequate bond to cover reclamation costs. Moreover, he said, the statute of limitations is "out on all this."

"Nellie Grant has absolutely nothing to do with Quartz Gulch," he said. "You can't run around holding that against people. That's capricious action."

Three other former officers of Sparrow took issue with Fayram's claim that he was not responsible for problems left by the Nellie Grant Mine. They said Fayram was in control until the board forced him to resign.

"He was running the goddamn thing," said Gordon Haig, a board director and major investor from Edmonton. "He was right on the frontline. He was making the decisions and making recommendations to the board."

Rodney Drake, another former director and retired gas-station owner in Kenosha, Wis., agreed. "He wasn't responsible, huh?" Drake said. "Then who was responsible?"

Fayram, who refused to say why he resigned, said he was replaced as president by James Denholme Jr., at one time based in Vancouver, B.C. He said Denholme was aware of Sparrow's financial woes when he took over.

Denholme could not be contacted for comment.

Meanwhile, Fayram said, he hopes to get the Quartz Gulch mine back in operation later this year. Last year, he operated under the small miner's exclusion, which exempts miners from filing plans if they work less than five acres of land and 36,000 tons of ore annually.

While examining plans earlier this year, the Forest Service expressed concern about whether existing dikes and dams were adequate and whether reclamation plans were adequate. Fayram said the project would add another settling pond.

He also said: "It is the company's policy to do the best job of reclamation as is *reasonably* possible and will cooperate fully with the Forest Service in the reclamation of Quartz Gulch."

Fayram said he hopes to soon post the

See MINE, 2A

Tribune

State officials are hoping to prevent recurrence of scen
where metal-laden water sits outside the Nellie Grant Min

Great Falls TRIBUNE, June 20, 1988
Great Falls, Montana

Mine

higher bond requested by the Forest Service in order to resume operations. Once that is done, he said, he will negotiate with the state Department of Health, which filed the lawsuit in March that charged his project was imperiling the water quality of Rock Creek. The department requested $20,000 in fines.

Fayram said he is willing to meet the department's request that he hire a Montana-registered engineer to supervise work on settling ponds.

In its suit, the agency said the mine violated state law twice last fall when settling ponds leaked, causing silt-laden water to spill through the gulch and into a nearby hayfield. The silt did not travel all the way to nearby Rock Creek.

The suit names as defendants American Eagle Mining, and Questor Mining and Equipment. It also takes the unusual step of naming Fayram individually.

Fayram said the incident was "blown way out of proportion" as there was just one spill, not two, and the silt did not get to Rock Creek. "We turned ourselves in," he added. "We're good corporate citizens."

If he can iron out that problem, Fayram said, he hopes to persuade the State Lands Department to give him a permit allowing expansion of his operations. Expansion, he said, would increase his efficiency.

But Fayram has much to do to satisfy the department.

Asked whether the department would consider Fayram's ties to Nellie Grant when deciding whether to issue a permit to the Quartz Gulch Mine, state Hardrock Bureau Chief Kit Walther said that was a legal question he could not answer. He also said he could not say anything about Fayram's operation because the information is confidential under the small miner's exclusion.

Meanwhile, the department's chief legal counsel, Lyle Manley, indicated that Sparrow's problems probably cannot be held against American Eagle. Corporate officers generally are not liable for the acts of a corporation, he said.

Fayram is listed in state records as the registered agent, a director and vice president of American Eagle and Questor. Directors of the companies are based in Texas, Alabama and California.

Except for Fayram, Sparrow had none of the same officers. Most of Sparrow's directors were from Canada.

Fayram's run-ins with state officials are not limited to the Nellie Grant and Quartz Gulch mines. The Health Department notified Normax, another mining company with which Fayram was associated, that it had violated conditions of its water-discharge permit at its Gold Crown Mine exploration adit west of Helena.

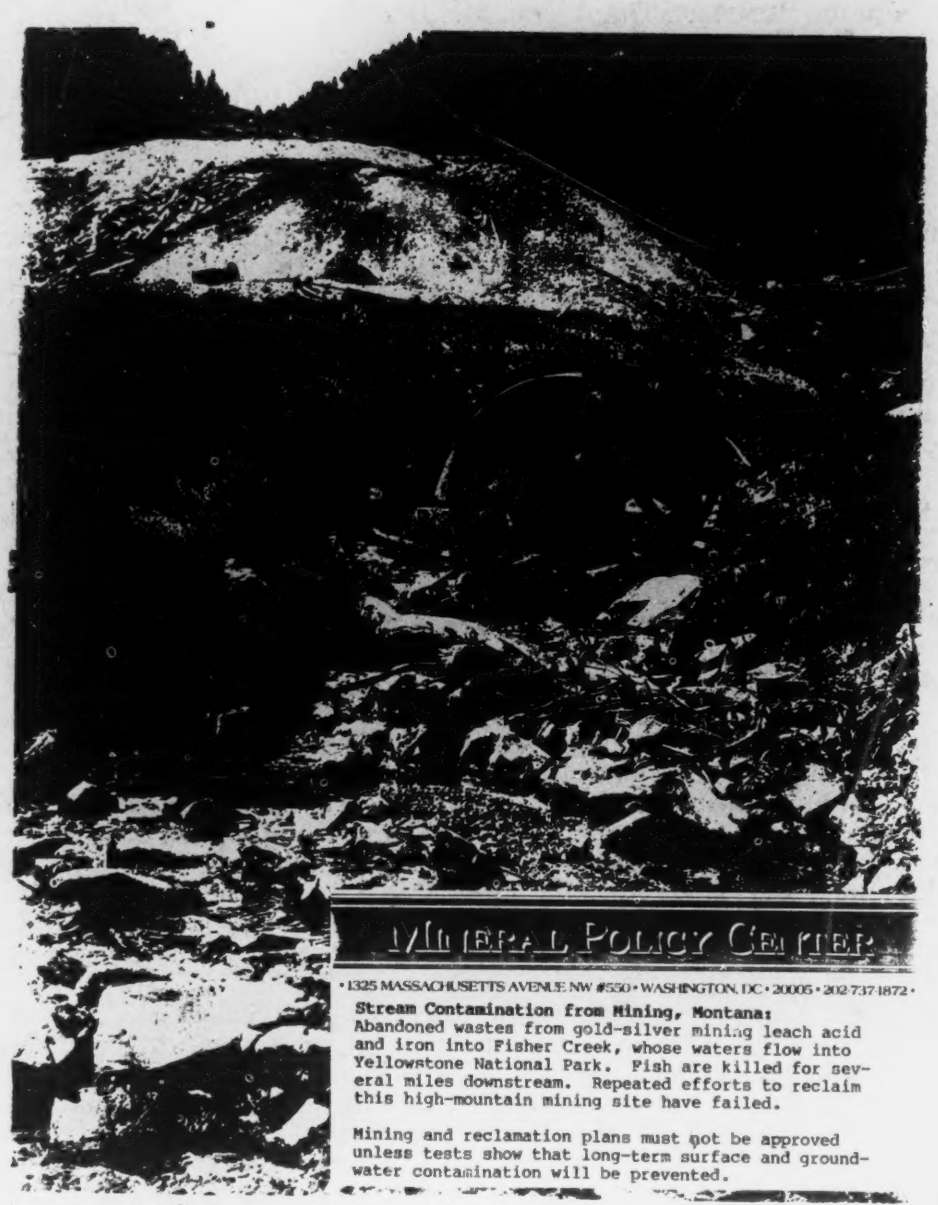
Officials said the violations were because of heavy rains that produced large flows of water through

From 1A

the site in the fall of 1981. The company ceased operations a short time later.

To deal with problems at the Nellie Grant site, the 1987 Legislature appropriated $78,000 from the Resource Indemnity Trust fund to reclaim the mine site. A bid request is expected this summer on the project, which will attempt to restore the area to its natural state.

Drought



MINERAL POLICY CENTER

• 1325 MASSACHUSETTS AVENUE NW #550 • WASHINGTON, DC • 20005 • 202-737-1872 •

Stream Contamination from Mining, Montana:
Abandoned wastes from gold-silver mining leach acid and iron into Fisher Creek, whose waters flow into Yellowstone National Park. Fish are killed for several miles downstream. Repeated efforts to reclaim this high-mountain mining site have failed.

Mining and reclamation plans must not be approved unless tests show that long-term surface and groundwater contamination will be prevented.

Senator BUMPERS. Thank you, Mr. Hocker.

Mr. Delcour.

STATEMENT OF DAVID W. DELCOUR, VICE PRESIDENT, AMAX MINERAL RESOURCES CO., AND CHAIRMAN, PUBLIC LANDS COMMITTEE, AMERICAN MINING CONGRESS

Mr. DELCOUR. Mr. Chairman, my name is David Delcour, Chairman of the American Mining Congress, Public Lands Committee. The biographic material and identification of the American Mining Congress is in the written statement, and I will not recite that now.

AMC believes the general mining law governing disposal of hard rock minerals on public lands is not in need of revision. Existing law more than adequately meets the four criteria that are essential to any mineral tenure law. These criteria are:

One, there must be nonexclusive access to search for minerals on public land;

Two, once detailed exploration is focused on a well-defined area, exclusive exploration rights must be available;

Three, those who discover valuable minerals must have an exclusive right to develop the minerals they have discovered; and

Four, where commercial quantities of minerals are discovered, tenure must be secure under terms reasonably set in advance.

During the life of the Mining Law, the Nation has undergone dramatic changes in minerals requirements and market conditions, and it has accommodated the challenge well. The broad body of judicial interpretation and administrative law has left virtually no question unanswered with respect to the Mining Law. It address land tenure and nothing else. Accordingly, it has accommodated changing social goals.

Today's mining activity on public lands is subject to the full array of environmental protection laws. Attached to my testimony is an extensive analysis of the operation of the Mining Law historically and currently which I would ask be included in the record.

In reviewing S. 1126, Mr. Chairman, there appear to be three principal goals: generating cash for the Federal Treasury; eliminating the transfer of public lands to private parties; and enhanced environmental protection of mined lands. AMC believes these goals are well served by existing law. If the Congress disagrees, however, we believe each of these concerns can be addressed in ways far less disruptive to the domestic mining industry's ability to meet national minerals needs.

In the case of royalty, for example, we believe the public receives a better return under current law through greater domestic production and by being able to mine lower grade ores. Any royalty would remove the incentive of small exploration ventures, since less margin would be available for an ultimate mine developer to share.

The royalty proposed in S. 1126 greatly exceeds those found in the private sector and at the very least should be sharply reduced.

Finally, reservation of a royalty could be incorporated into the existing Mining Law, thereby avoiding the terrible disruption that would accompany wholesale revisions to the law.

Other proposed fees in S. 1126 are similarly onerous. While an exploration project by a major mining company may typically spend at levels specified in the diligence provision of the bill, the small explorationists who develop prospects to the point where they are of interest to larger companies simply would be put out of business.

We view the patenting issue in a similar way. While it is true that a short-life precious metals mine can and does operate often without ever going to patent, longer life mines, the base metal type mines which are vulnerable to periodic world market triggered closures continue to require the security of tenure which only comes through the issuance of a patent.

Nevertheless, if Congress feels it must assure that mine sites remain in public ownership for the long term it would make far more sense to develop a reverter provision within the context of the present patent provisioning features of the law.

A recent General Accounting Office report has been referred to extensively today. Attached to my testimony is a rather comprehensive rebuttal of that report which I would ask be included in the record.

I would simply point out now that I believe the rebuttal refutes every major assertion of the report, identifies 36 important errors and omissions, and I would hope if we agree on nothing else today that the substance of that report not be seriously pursued in this debate.

Reclamation of mine lands is required nearly everywhere under State law. I can think of only two states that do not have a specific reclamation law, at least two mining states. In the future, EPA's development of mine waste regulations inevitably will lead to further Federal restrictions on reclamation as well as groundwater controls as they evolve.

Of course, activity on public lands is well regulated by FLPMA. Now I cannot say to a moral certainty that there are no exceptions or loopholes in FLPMA relative to mine land reclamation on public lands. There may be. None particularly come to mind. But if you feel there are, our suggestion would be that you take a look at changing FLPMA. I do not think it is necessary to change the land tenure law and insert a reclamation provision in that law to address this problem.

Finally, I guess, Mr. Chairman, we believe the issues raised by S. 1126 are quite substantial ones. They have implications far too extensive to fully consider today, and we urge additional hearings on the principal features of the bill including field hearings in the public land states prior to any formal markup of legislation.

Finally, I would like to thank you for inviting the AMC to participate in today's hearing and to assure you of our industry's willingness and availability to pursue these issues with the committee and its staff in the future.

Thank you.

[The prepared statement of Mr. Delcour follows:]

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John A. Knebel
President

Statement of

American Mining Congress

on

General Mining Law

by

David W. Delcour

Vice President

AMAX Mineral Resources Company

and

Chairman, AMC Public Lands Committee

Subcommittee on Mineral Resources

Development and Production

of the

Committee on Energy and Natural Resources

United States Senate

June 7, 1989

Mr. Chairman, members of the Subcommittee, my name is David Delcour. I am Vice President of AMAX Mineral Resources Company, a division of AMAX Inc., and Chairman of the American Mining Congress Public Lands Committee. I am appearing today in response to your invitation to the American Mining Congress.

American Mining Congress is an industry association that encompasses (1) producers of most of America's metals, coal, and industrial and agricultural minerals; (2) manufacturers of mining and mineral processing machinery, equipment and supplies; and (3) engineering and consulting firms and financial institutions that serve the mining industry.

The American Mining Congress Declaration of Policy expresses the view that the General Mining Law governing disposal of hardrock minerals on public lands is not in need of revision. This position is based on our conclusion that existing law more than adequately meets the four criteria that are essential to any mineral tenure law. These criteria are:

1. There must be non-exclusive access to search for minerals on public land;
2. Once detailed exploration is focused on a well-defined area, exclusive exploration rights must be available;
3. Those who discover valuable minerals must have an exclusive right to develop the minerals they have discovered, and

4. Where commercial quantities of minerals are discovered, tenure must be secure under terms reasonably set in advance.

Existing law meets these four criteria and has done so for 117 years. During that time, the nation has undergone dramatic changes in minerals requirements and market conditions. From precious metals vein deposits, to high grade base metals deposits, to meeting the national need for uranium, to the porphyry copper and molybdenum deposits, to the broadly disseminated gold deposits, the Mining Law has accommodated the challenge. A broad body of judicial interpretation and administrative law has left virtually no question unanswered with respect to the Mining Law. It is a law which addresses land tenure and nothing else and, accordingly, it has accommodated changing social policy goals. Today's mining activity on public lands is subject to the full array of environmental protection laws. Attached to my testimony is an extensive analysis of the operation of the Mining Law historically and currently which I would ask be included in the hearing record.

In reviewing the "Mining Law of 1989," Mr. Chairman, there appear to be three principal goals: generating cash for the federal treasury, eliminating the transfer of public lands to private parties, and enhanced environmental protection of mined lands. The American Mining Congress believes these goals are well and adequately served by existing law; however, if the Congress disagrees, we believe each of these concerns can be addressed in ways far less disruptive of the domestic mining industry's ability to meet national minerals needs.

In the case of royalty, for example, we believe the public receives a better return under current law through greater domestic production and by being able to mine lower grade ores. Any royalty would remove the incentive of small exploration ventures since less margin would be available for an ultimate mine developer to share. The royalty proposed in the "Mining Law of 1989" greatly exceeds those found in the private sector and, at the very least, should be sharply reduced. Finally, reservation of a royalty could be incorporated into the existing Mining Law, thereby avoiding the terrible disruption that would accompany wholesale revisions to the law.

Other fees proposed in the "Mining Law of 1989" are similarly onerous. While an exploration project by a major mining company may typically spend at levels specified in the diligence provision of the bill, the small explorationists who develop prospects to the point where they are of interest to larger companies simply would be put out of business. To lose this important link in the mineral development chain would be devastating to the entire industry.

We view the patenting issue in a similar way. While it is true that short-lived precious metals mines can and do operate successfully without ever going to patent, longer lived base metals mines, which are vulnerable to world market triggered closures, continue to require the security of tenure which only comes through the issuance of a patent. Nevertheless, if Congress feels it must assure that mine sites remain in public ownership for the long-term, it would make far more sense to develop a reverter provision within the context of the present patent provisions.

A recent General Accounting Office (GAO) report has left readers with the impression that the patent process is widely abused and is little more than a vehicle for real estate speculators to defraud the public. The report is grossly inaccurate as has been so demonstrated in a thorough review undertaken by the American Mining Congress. Our review disproves every major assertion in the GAO report and notes 36 important errors and omissions. I would ask that the report, which is attached to my testimony, be made a part of the hearing record.

Reclamation of mined lands is required nearly everywhere under state law. The Environmental Protection Agency's development of mine waste regulations inevitably will lead to an additional layer of reclamation requirements as will the evolution of federal and state ground-water controls. Activity on public lands is well regulated pursuant to the Federal Land Policy and Management Act by the federal land managing agencies. If there are reclamation deficiencies, they are attributable to insufficient enforcement and not to insufficient legal authority. Any change in federal reclamation requirements, should change be found necessary, ought to be in the form of an amendment to the Federal Land Policy and Management Act, not to the Mining Law.

AMC believes it is unwise public policy to link environmental protection to land tenure. As for mandatory bonding, we would urge the Congress to proceed with great care. Most smaller operators cannot obtain reclamation bonds. Those who can find them very expensive and increasingly difficult to obtain. There simply must be more viable, less disruptive ways for the public to secure the performance of reclamation obligations.

Mr. Chairman, while reasonable people can disagree over the need for the changes proposed in the "Mining Law of 1989," we hope the Committee at least will agree that any necessary changes be made in a way which leaves current law intact to the maximum possible extent. After 117 years, there are virtually no unanswered questions on the meaning or application of the Mining Law. To repeal that established, successful body of law with brand new language requiring extensive regulatory implementation would halt new mining activity for a number of years, even if implementing regulations could avoid judicial challenge. Much of the industry could not survive such a hiatus.

Finally, Mr. Chairman, we believe the issues raised by the "Mining Law of 1989" have implications far too extensive to fully consider today and we urge additional hearings on the principal features of the bill, including field hearings in the public lands states, prior to any formal markup of legislation.

On behalf of the American Mining Congress, I want to thank you for inviting our participation in today's hearing and I want to assure you of our industry's willingness and availability to pursue these issues with the Committee and its staff in the future.

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John A. Knebel
President

The Mining Law

A Flexible and Responsible
Public Policy
That Works for America

American Mining Congress

June 7, 1989

INTRODUCTION

In its most recent Declaration of Policy, the American Mining Congress renewed its support for retention of the General Mining Laws. We particularly support the features that permit self-initiated exploration and that provide security of title in the event of discovery. The same policy statement goes on to oppose placing locatable minerals under a leasing system. The policy notes that in contrast to the General Mining Law, leasing, with its attendant rulemakings, environmental clearances and exposure to delaying litigation, would discourage and reduce mineral exploration and would preclude many individuals and small firms from activities on public lands.

The American Mining Congress believes there are four concepts that are basic to any realistic and effective mining law:

o First, prospecting for minerals should be encouraged by allowing individuals and companies maximum and nonexclusive access to the public lands to search for mineralization.

o Second, a prospector should be given exclusive exploration rights for any particular area for the time he is focusing detailed exploration attention on it.

o Third, a person who discovers a viable mineral deposit should have an exclusive right to develop and mine it, including the right to defer such development for a reasonable period of years until economic or technological conditions justify production.

o Finally, the law must provide a mining venture with security of tenure for the duration of mining on terms reasonably set in advance.

The existing General Mining Laws serve these objectives admirably and do so without thwarting other important public policy objectives.

Over the years, the deficiencies of a leasing system have become apparent to many, including some who once were leasing enthusiasts. Accordingly, it is not our purpose to restate the case against leasing.

The American Mining Congress believes the Mining Law to be one of the most ingenious pieces of public policy ever formulated in the United States. Its endurance is testimony to its flexibility and responsiveness. It has accommodated a series of mineral booms and busts and continues to do so. It has accommodated pervasive environmental regulation and modern land use planning. In so doing, it has spawned a comprehensive and predictable body of law. In short, it works.

Historic Analysis

Congress has maintained a careful eye on the public lands, and has made adjustments to the Mining Law and related public land statutes when required. The last significant amendment to the General Mining Law was a helpful revision of the annual labor requirement that permits use of modern geophysical and geochemical surveys as assessment work. That was in 1958. The most recent change in public land law of importance to mining was the passage of the Federal Land Policy and Management Act in 1976.

The Mining Law:

o Was well-suited to the needs of a sizeable and sophisticated hardrock mining industry when it was enacted.

o Has worked well for over a century as a fair, efficient and predictable basis for one of the worlds's most prolific and successful hardrock mining industries.

o Has accommodated changes, particularly with respect to environmental control and land use planning.

o Continues to serve the nation well, providing incentives and a level playing field for all who seek to discover and develop minerals, and an efficient and predictable vehicle for protecting interests of both mineral developers and the public.

Statutes enacted in 1866, 1870 and 1872, together with a large body of case law, including many Supreme Court decisions and Department of the Interior administrative rulings, make up what we now call the General Mining Law. Contrary to notions that these laws were written to serve the needs of a bunch of rustic pick and shovel prospectors, Congress enacted the Mining Law in response to demands of westerners for secure title to mines that already were developed, and that were the economic underpinning of Nevada and California, including all of the agriculture, trade and commerce, town building and other economic activity being undertaken in those states.

By 1866, the California gold rush had matured and a sophisticated gold mining industry had emerged. Placer mining was particularly important in the 1850s and 1860s. Enormous water works were constructed in California, and "became big business." A gigantic system of dams, lakes, reservoirs, canals and pipelines was constructed to supply water to dozens of large hydraulic mines. Hundreds of miles of ditches were built at tremendous costs even by today's standards. In the early 1860s it was reported that there were 5,328 miles of water courses for miners constructed at a cost of $16 million (in today's dollars that is roughly $140 million). At the zenith of hydraulic mining, the total length of right-of-way for ditches, flumes and pipelines reached 8,000 miles. Investments of that magnitude required a secure title to the mines that those vast waterworks served.

The lode mines of California were also major undertakings even by today's standards. The Empire mine at Grass Valley was discovered in 1850 and produced for 105 years, ultimately becoming one of the deepest mines in the world, developed to an inclined depth of 11,007 feet. The Empire and a number of the other early California mines produced in excess of one million ounces of gold each, and total California production of gold from 1848 to 1866 was 38.8 million ounces - more than we produced in all U.S. mines last year. There were 2,000 miners at Grass Valley in 1866.

Likewise in Nevada, the mines of Comstock Lode produced incredible quantities of silver and gold, and were developed by mining practices as sophisticated as any employed at the time in Europe. Many of these practices were, if anything, more complicated than the techniques used in big mines today.

In 1866, 1,386 miners labored in Comstock Lode mines, producing 1,435 tons of ore per day from underground workings. This yielded in excess of $14 million. During the six years following the discovery of the lode (1860-1865) about 28 miles of tunnels and drifts had been excavated and about 5 1/2 miles of shafts, winzes and inclines. By 1866, the Gould & Curry Mine had been excavated to a depth of 821 feet. The Comstock Lode mines were clearly as large as most of today's gold and silver mines, and can hardly be called pick and shovel mines.

The point of these statistics is to show that if the Mining Law was effective for the enormous gold and silver mines of yesterday, it will surely be able to handle the smaller new mines that we are building today. The new Hog Ranch gold mine in Nevada, produces 50,000 ounces of gold per annum by modern open pit mining and heap leaching. This is a typical new mine. By comparison to the mines of the past, its production and its land requirements are modest. The charge that the Mining Law is not effective today because it is old and was designed for a different kind of mining is a classic non sequitur--it just is not so.

This great western mining industry grew up at a time when there was no national mining law, under local rules made up by miners on the spot. Senator Stewart, generally regarded as the father of the Mining Law, knew a lot about that popular lawmaking, and how it reflected the sentiment and experience of those who came west to develop its resources. A 49'er (he actually arrived in San Francisco on April 7, 1850), Stewart mined for a time, but ended up practicing law in the gold camps. In 1852, he served as secretary of a miners' meeting held in Nevada County, California, to adopt mining district rules for lode mining companies. Much of the language of the Lode Law of 1866 is derived from the Nevada County rules, which in themselves contain mining law principles that can be traced back to Mexico, Spain, Germany and the mining centers of England and Wales.

The General Mining Law wisely adopted and codified what the miners themselves had developed as a workable body of law. It permitted free mining, and allowed the states a say in how mining was conducted. It was hailed, at the time, as a miner's Magna Charta, and was well received by all interests in the west.

Over the years, major mining districts have developed all over the west. All have been developed successfully under the General Mining Law and all have provided the nation with the benefits of prolific hardrock mineral production.

How well did the General Mining Law accommodate the development of these new districts and new commodities? And how well did it accommodate new exploration techniques?

It is our view that it handled new development remarkably well. When major new changes came along, the law was sometimes more fully developed through litigation. The big issues of lode versus placer and extralateral rights were fought out in incredible litigation during the latter part of the 19th century. The Supreme Court has sorted out most of the principles involved, leaving us today with a common law of mining that renders the Mining Law highly predictable. These litigations were the great cases of that era. And the issues are settled--we know what the law is in these areas. If the Mining Law is significantly revised, our industry would have to go through the litigation process again--and that we just cannot afford. Like the patent law, there is a lot of litigation under the Mining Law. But like the patent law, we also have a system that benefits from certainty, and which serves the nation well.

That the law was remarkably flexible is shown by the fact that it has accommodated everything from the gold placers at Nome, Alaska, the silver deposits of the Coeur d'Alene, the large open pit porphyry copper mines such as the Bingham pit in Utah, and giant underground mines like the Henderson molybdenum mine in Colorado.

Today the Mining law continues to work well. New gold mines are being developed all over the west. Most of these are on mining claims. Clearly, the law is accommodating this activity, permitting economic development to go forward in rural parts of Nevada, Idaho, Montana, Washington, South Dakota, Oregon, California, Utah, Arizona, Colorado and other states--rural areas that certainly can use the payrolls associated with these developments.

This country never has had a problem obtaining hard minerals from its public lands. The General Mining Law encourages access to minerals, and when prices are right we have produced plenty of copper, gold, silver, mercury, tungsten and uranium. If the law is left in place, we will be able to continue to meet any challenge to produce.

The General Mining Law also fits well into new schemes of public land management and has accommodated new notions of environmental control. It is a land tenure law that happily does not combine property rights and social controls in one comprehensive scheme. Property laws are necessarily resistant to change. Part of this nation's social contract is based upon a notion of stable institutions, particularly our notions of property rights. We do not change property laws often. To do so would perturb our economy--changes in property rights make us nervous.

Like the Constitution, the Bill of Rights and the Yellowstone Park Act, the General Mining Law is old and has not been amended very often. On the other hand, our ideas of how to behave keep changing and we use laws of general applicability to control pollution and to regulate how recreationists may behave on public land. We do not want to lock in codes of conduct and it is therefore wise that environmental controls be imposed upon mining in statutes of general applicability, and not in the General Mining Law.

As with environmental control, the General Mining Law is relatively neutral with respect to land use. Congress has the authority to make the rules with respect to withdrawals and land use plans on federal lands. Disputes over siting are not a defect of the Mining Law and are worked out in other arenas. The law wisely permits self-initiation. Absent this feature, we believe that this nation's public lands would be hopelessly ensnarled in land use controversy for decades to come, and what is left of our hardrock mining industry would disappear. Local and special interest advocates always will find some way to justify exclusion of mining. Congress must look after the interests of all of the people of the United States and should retain the current system as a bulwark against politicizing every mine siting exercise.

The General Mining Law was well conceived when enacted, has worked well for a century, is the basis of one of the world's most successful hardrock mining industries, and the law continues to work well.

You do not see mine operators or prospectors and small mining company people clamoring for change in the Mining Law. Quite the contrary. It is the view of the American Mining Congress, after plenty of deliberation among our colleagues, including particularly the men and women who find and build and operate mines, that the law works well and should be retained.

All up, the hardrock mining industry is getting along well on the public lands. Mines are being discovered and placed into production; land use and environmental issues are being resolved locally; new jobs are being created directly at the mines, and secondary employment in support of the new mines is a big help to the rural areas of the west. The present law is working and will keep working for a long time to come.

The Mining Law Today

The Mining Law provides a very workable and equitable mechanism for allowing the exploration of public lands for locatable minerals and the efficient development of those minerals that are discovered on the lands. Also, the Mining Law allows private individuals and companies to perform this exploration and development work while still being regulated adequately by the various federal agencies designated to apply the currently appropriate standards of environmental protection, including general environmental conditions deemed appropriate for all exploration sites and such additional specialized requirements as the agencies consider to be necessary for specific sites.

The Mining Law strikes a uniquely workable balance between protecting the public need for environmental protection of public lands with the private mineral developers' need for access to such lands and security of title to minerals discovered there. In so doing, the Mining Law can be said to meet the comprehensive public need for environmentally responsible, yet economically efficient, mineral exploration and development of public lands.

Hardrock mineral deposits are small in size; they are hard to find, and they are easy to miss. In fact, they are easy to miss even if you find them. The small size of such deposits is illustrated by the Carlin mine in Nevada. The mine is one of the largest gold mines in the country and has been producing continually for more than 20 years, but the orebody is small. An example of missing a deposit even when it has been found is the Relief Canyon mine in Nevada. It was originally located as a metallurgical-grade limestone deposit in anticipation of demand for cement to be used for the construction of the proposed MX missile complex. Since the gold mineralization in the limestone consists of particles of gold that are too small to be seen by the naked eye, and since gold was not suspected to exist in the limestone, the deposit was not assayed for gold until the missile project was abandoned and a gold reconnaissance survey of the area was conducted by another mining company. The discovery of the gold that is now being mined was made only because of the discipline of the survey procedures. Exploration for hardrock mineral deposits is not just analogous to searching for a needle in a haystack, at times it is literally the equivalent of searching for an invisible needle.

Another reason that the success rate for hardrock mineral discoveries is so low is that in addition to the small size of the targets, the number of variables that must be considered in locating them are great, and the available data about these variables are very limited.

These characteristic difficulties require that prospectors be able to obtain ready and repeated access to the target areas so that they can apply and test their discovery theories. The exploration difficulties also require that there be enough economic incentive that prospectors will be motivated to continue the years and years of work that are necessary in order to find a minable orebody. The Mining Law meets both of these requirements by providing adequate self-initiated access for prospectors willing to search for discoveries and adequate security of title for individuals and companies that are successful in making discoveries.

Reference to the history of some actual mines may help to illustrate the way in which the Mining Law works in practice to meet these needs. The Carlin gold mine in Nevada is an example of a prospector's dream. The area had been mined for shallow placer deposits intermittently in the early 1900s, but without spectacular results. The publication in 1960 of a broad-based geological survey triggered an idea by two geologists about the possible conjunction of a specific type of geologic feature with the deposition of gold. In 1961 a mining company, after study, was willing to invest the funds necessary to drill the target. New claims were staked in the area, a drilling program was designed and begun, and gold ore was hit on the third hole. A mine was then developed to recover the gold and a whole new type of gold deposit, the Carlin-type deposit, became part of the hardrock exploration industry's models.

A measure of the worth of the Mining Law is the way that it can deal with the whole range of exploration efforts. The Mining Law allows quick development of an orebody that is found readily and provides adequate access and incentive for the exploration pioneers testing new theories. The Mining Law also allows the diligent, partially encouraged prospector to retain the value of his exploration efforts so long as he continues to try and home in on the target, and it allows the property ownership slate to be wiped clean when prospectors abandon unsuccessful mineral location efforts, thereby allowing subsequent generations to come back into an area as new theories and new clues become available.

The Pinson mine in Nevada is an example of the manner in which the Mining Law allows partially encouraged prospectors to maintain their interest in a deposit while they continue to refine their exploration and ultimately develop a mine. The claims were initially located in the 1930s and worked on a small basis for the next 30 years while the owners continued to try to prove up a large orebody. In the early 1970s, the owners succeeded in interesting a larger exploration group, which leased the claims and succeeded in discovering a bigger reserve. A mine was not developed because of mediocre gold prices. The lessee continued to work on the claims, perform assessment work and expand the reserves, and by the late 1970s, when gold prices rose sufficiently, the preset mine was developed. The claims that form the core of the orebody are still owned by the original claimant's family. The Mining Law provided the claimant, and his subsequent lessee, adequate security of title so that there was an incentive to continue to explore and develop the target, over a period of 40 years, and ultimately participate in the successful development of a large scale mine.

The Maggie Creek mine in Nevada is an example of the title clearing function of the Mining Law in situations where exploration is unsuccessful. The Maggie Creek area was explored in the mid 1960s by the same company that developed the Carlin mine. Claims were staked and drilling was done, but the results were unsatisfactory and the claims were dropped. Thereafter, a second mining company developed another theory, staked claims and drilled holes. Their results were also unsatisfactory and their claims were dropped. In the mid-1970s, an individual prospector developed his own theory about the potential location of mineralization. He located claims in the area and developed some favorable anomalies. On the basis of this work, he offered the property to the company that had first explored the area, and after reviewing this theory and data, the company drilled the property and this time discovered the orebody that was subsequently developed into the Maggie Creek mine. The companies' earlier drilling had missed the orebody by only 100 yards. In addition to showing that hardrock mineral targets are small and difficult to find, the Maggie Creek history also shows that the Mining Law functions efficiently to allow the repeated access to an area, which is necessary in order for different prospecting theories to be tested as they are developed.

A broad-scale example of the effectiveness and fairness of the operation of the Mining Law can be seen in the rapid expansion of gold mining in Nevada from the mid-1970s to the present. During this period, the rapid increase in the price of gold, combined with the development of new mining technologies that allow the recovery of gold from low grades of ore, created a great deal of interest in the exploration and development of federally owned lands in Nevada. In 1976, gold production from Nevada's mines was about 200,000 ounces. By 1986, gold production from Nevada mines had increased to 1.9 million ounces, and in 1987, Nevada gold production exceeded 2 million ounces. In 1986 alone, there were 12 new mines developed in Nevada. In addition to the benefits derived from the private owners and operators of these mines, substantial benefits have been received by the residents of the state as a whole.

The mines developed in 1986 involved the creation of more than 2,000 new jobs, and the mining industry as a whole paid an average individual annual wage of $29,837, which is by far the highest for any industry in the state. These wages, together with the net proceeds of mine taxes and sales and property taxes, substantially benefitted the entire economic community of the state. In addition to providing the large paychecks, most of the mines are located in rural counties where the economic support is most needed and mining companies are nearly always the county assessor's largest taxpayers.

Given this dramatic growth of gold mining in Nevada, many critics of the Mining law would have predicted a wide range of abuses, including the development of chaotic land rushes and widespread blanket staking of claims, big company power plays trampling the interests of long-time small miners and prospectors and, alternatively, the strangulation of new development by the cluttering effect of dormant and stale claim holders.

The facts show, however, that the Mining Law worked very well to allow the orderly discovery and development of so many new mines in such a short time.

The examples of the Florida Canyon and Jerritt Canyon mines can be cited to show that the Mining Law did not allow long-time claim owners who were diligent in retaining and developing their property to fail to participate in the ultimate development of their miners. The Florida Canyon mine in Pershing County, Nevada, was located and originally explored by a prospector from California. By the time the orebody was adequately developed and economic conditions justified commencement of mining operations, the prospector was elderly and in a rest home. The mining company now operating the mine is making payments to the original locator's family, which are being used for his support. The Jerritt Canyon mine north of Elko, Nevada, is another example where an individual prospector is sharing in the fruits of the present production of his discovery. The core claims were staked in the 1950s for antimony. When the prospector managed to interest a large mining company to inspect th antimony claims, the company discovered that the claims had substantial gold values. That company then formed a joint venture with another mining company that helped to develop what is now one of the largest gold mines in North America. The original locator continues to benefit from the mining of the claims he located.

Although the geologic data base and ore genesis models continue to grow each year, the combined discovery success rate for individual prospectors, small miners and large corporate exploration departments is still very low. In order to continue to make discoveries of hardrock orebodies, it is necessary for all explorationists to continue searching, continue to develop new theories and continue to develop new applications for old theories. In order to find new orebodies, prospectors must go back to an area again and again as they learn more and as they think more. This means they must have the legal ability to do so, and they must have the economic incentive to do so. The Mining Law works well in meeting these requirements.

The Mining Law Accommodates Environmental Requirements

The environmental laws enacted in the past two decades have had a profound effect upon activities under the Mining Law and give a very good example of the flexibility inherent in that law and how it adapts to changing circumstances.

Environmental laws involve several different sources of regulation: federal statutes of general applicability, federal statutes that have amended the Mining Law, federal administrative regulations and decisions, state environmental and reclamation laws, state amendments to their laws relating to the location of mining claims, local ordinances and, finally, changing interpretations of the Mining Law itself. We would like to emphasize the role of state environmental protection regulation and also the question of "discovery" of a valuable mineral deposit under the Mining Law.

The statutes of general applicability in the area of environmental protection are well known. Activities under the Mining Law may be affected by any of the following: the Clean Air Act, the Clean Water Act, the Safe Drinking Water Act, the Resources Conservation and Recovery Act, the Comprehensive Environmental Response, Compensation and Liability Act (Superfund), the Toxic Substances Control Act, the Endangered Species Act, the Archaeological Resources Protection Act, and numerous others. Also, the National Environmental Policy Act (NEPA) requires the preparation of an environmental impact statement whenever a federal agency has to take a major action significantly affecting the quality of the environment. Generally, the applicability of NEPA will not be triggered by exploration activities under the Mining Law but the development of a mine probably will require some federal permit, license or right-of-way that will result in the preparation of an environmental impact statement under NEPA.

The Mining Law has been amended specifically for purposes of environmental protection on a number of occasions. Perhaps the first such amendment that we should recall is the Multiple Use Mining Act of 1955, which asserted the right of the United States to manage all of the surface resources of a mining claim not reasonably needed by the claimant prior to the issuance of a patent. More recently the Mining Law has been amended by the Federal Land Policy and Management Act of 1976 which, among other things, ordered the Secretary of the Interior to take action to prevent unnecessary or undue degradation of the land administered by the Bureau of Land Management.

Subsequently, the Surface Mining Control and Reclamation Act of 1977 (SMCRA), which established a nationwide comprehensive program regulating the environmental effects of coal mining, also contained two provisions relating to the environmental effects of noncoal mining. Section 601 of the act established a procedure for assessing whether certain federal lands of urban or suburban character should be deemed unsuitable for mining, and Section 709 of the act provided for a study of noncoal mining to determine whether SMCRA-type legislation would be useful in regulating such mining. The Section 709 study was conducted by the Committee on Surface Mining and Reclamation (COSMAR) and concluded in 1979 that SMCRA-type provisions would be of limited value in addressing the problems associated with noncoal mining.

Even more recently, the FY 1987 Department of the Interior appropriations bill contained a directive to the Department mandating bonding in connection with reclamation of land disturbed under the provisions of the Mining Law.

There have also been two comprehensive sets of administrative surface management regulations promulgated relating to Mining Law activities, one by the Forest Service, and one by the Bureau of Land Management.

These comprehensive regulations have imposed substantial new requirements on all attempting to accept the Mining Law's invitation to prospect for minerals on the public lands and to develop any valuable deposits that are discovered.

Federal law allows the states to establish location procedure for mining claims insofar as they are not inconsistent with federal law. These changes have substantially reduced the detrimental consequences to the environment from locating mining claims.

The growth of state concerns for environmental protection can be illustrated by the expansion of state statutes requiring reclamation of land that has been affected by mining. In early 1970, only three states had statutes that affected mining for hardrock minerals, although there were four states with statutes relating to dredge or hydraulic mining. Today, however, the situation has changed completely and only four of the 14 public lands states do not have comprehensive reclamation statutes relating to hardrock mining. Moreover, those four not having reclamation statutes have other laws affording protection from the consequences of mining to other resources such as surface and groundwater.

Such state reclamation statutes typically cover both mining and exploration, excluding small operations with no significant surface disturbance. Permits are usually required prior to commencement of mining and an operation or reclamation plan must be approved in order to obtain a permit. There are specified reclamation standards and provisions for performance and reclamation bonds resulting in a comprehensive program of regulations.

It should also be noted that some states have water and air pollution requirements that are more stringent than those established by federal law. Moreover, four of the public lands states have their own state equivalent of the National Environmental Policy Act and several also have industrial siting acts. All of these statutes have application to operations under the

Mining Law if such operations have a substantial impact on the environment.

An important legal question in this area has always been how far the states should be permitted to regulate federally licensed or approved activities, expecially when they are occurring on public lands, as are most activities under the Mining Law. The question is whether the federal scheme has pre-empted state regulation. In California Coastal Commission v. Granite Rock Company, decided in March 1987, the Supreme Court held that the California Commission could require a permit for a mine on an unpatented mining claim in a national forest and that the Mining Law and the Forest Service regulations did not pre-empt the applicability of the state permit requirement. In so holding, the Court said that the state had indicated that it was not attempting to prohibit the mining activity, but only to regulate the environmental consequences. The Court drew a distinction between regulating land use for environmental protection and prohibiting land use. It assumed, without deciding the issue, that the federal statutory and regulatory scheme would pre-empt the state from prohibiting a land use selected by the federal government but would not prohibit the state's attaching environmental regulations that do not amount to a prohibition.

It would seem that the Granite Rock decision will raise some interesting questions with respect to all state laws applicable to mining operations on federal lands. It is probable that such laws will be determined to be applied validly so long as they merely attempt to afford protection for the environment and do not constitute land use determinations.

At the very heart of the Mining Law is the question of whether there has been a discovery of a valuable mineral. A discovery confirms the claimant's possession of the ground located. Prior to the time of discovery, the claimant's rights of possession to his location is based only on the doctrine of "pedis possessio."

The Mining Law does not define what constitutes a discovery and consequently the definition of discovery has been developed over the years by a series of administrative and court decisions. As it has evolved, the determination of whether a discovery exists involves the application of two tests--the "prudent man rule" and the "marketability rule."

The prudent man rule often is stated to require two things: First, minerals must be found within the claim; and second, the evidence must be of such character that a person of ordinary prudence would be justified in the further expenditure of his labor and means with a reasonable prospect of success in developing a valuable mine.

On the other hand, the marketability rule extends the prudent man rule by adding the requirement that the minerals be shown to be presently marketable at a profit. The Supreme Court has characterized the marketability rule as a refinement of the prudent man rule, but it can be clearly seen that the difference between the two rules hinges upon the distinction between the present situation and the prospect for the future.

It would appear that the prudent man rule alone is applicable in contests between conflicting mining claimants, whereas the marketability rule, in conjunction with the prudent man rule, is applicable in contests between the United States and the mining claimant. It may well be, also, that the marketability rule is not to be applied to deposits of minerals that are generally conceded to be valuable and is only to be applied to low-value minerals of widespread occurrence.

In any event, whether the determination as to discovery is based on the prudent man rule or the marketability rule, it is clear that the anticipated cost of mining the minerals is a major factor in the determination. Consequently, a prudent man would have to consider not only the costs of physically extracting and processing the minerals to make a saleable product but also the costs of complying with the applicable environmental protection laws.

Hence, it would appear that as changes occur with respect to the general regulatory requirements placed on the mining industry, the rule for what constitutes a discovery under the Mining Law will change with it. This is a classic example of how this century-old statute accommodates itself to changing conditions.

The Mining Law Accommodates Land Management Requirements

The Forest Service and the Bureau of Land Mangement (BLM) are mandated by Congress to carry out public land management and planning in accordance with the principles of multiple use. Those principles include the management of public lands and their various resource values in such a manner that they are used in the combination that will best meet the present and future needs of the American people. Multiple use also includes the principle that some lands will be used for less than all of their resources and that periodic adjustments must be made to conform to changing needs and conditions. The management of mineral resources under the Mining Law System fits well into this concept of multiple use.

Mineral resources constitute only one category of the abundant natural resources of our public lands. However, the characteristics of mineral resources cause them to occupy a unique, but not preferred, position among those other natural resources.

One of those characteristics is that mineral resources lie buried and hidden from view. Until discovered, they are not quantifiable and their values cannot be compared with other public land natural resources such as timber, forage, water, land space and recreational values. It is a very obvious but often ignored fact that minerals can be mined only where they occur as small isolated geologic quirks of nature. To mine a discovered orebody, there is no alternative location for the site for mine development. This is in contrast to other visibly identifiable public land resources such as forage and timber, having wide territorial expanse that offers more alternatives to the locations for their development.

It is for this reason that, in accordance with multiple use principles, the Mining Law System works well with public land management and planning by allowing nonexclusive and nondisruptive access to public lands that are not withdrawn and exclusive rights to the limited area covering a discovered orebody.

Another distinguishing characteristic of mineral resources is that mineral deposits are rare and occur only by the coincidence of unusual combinations of geologic events. The rarity of economic mineral occurrences requires large land areas to be available for mineral exploration. The likelihood of finding an orebody in a favorable region is proportionate to the land available in that region for exploration. The Mining Law System allows maximum access for exploration and accommodates multiple use of those lands.

In contrast to some uses, such as wilderness whose proponents demand total exclusive use of vast public land areas, mineral exploration under the Mining Law System allows true multiple uses over equally large areas. Under the Mining Law System, even where mining claims are located in the final target area of exploration, the general public has the right to use that area for recreation and for access to other public lands.

Therefore, the Mining Law System allows the multiple use of public lands in its purest sense. It is only in the fortunate but rare instance where an economic orebody is found and a mine is developed that the Mining Law System allows, and the practicality of mine development requires, the exclusive use of an area up to a few square miles in size. Therefore, except for the excessive areas of withdrawn public lands, the bulk of which were withdrawn without considerations involved in modern land planning, the Mining Law System works well with the multiple use principles of public land management and planning.

The Mining Law System regime of laws under which locatable minerals may be explored for, found and developed on public lands today is much different than the original Mining Law of 1872. It is sometimes said that the Mining Law of 1872 should be repealed or substantially amended because it is antiquated, with the inference being that any law more than 100 years old could not serve modern times. Although such a general presumption is not necessarily correct, it is certainly not correct in view of the substantial legislative, judicial and administrative modification which have been made to that original Mining Law.

There have been more than 37 statutes enacted that either directly amended the original Mining Law or apply directly to operations conducted under the Mining Law System. In this manner, the original Mining Law has been viable and flexible to accommodate modern public land management, planning and environmental needs.

Therefore, it is proper to refer to the system under which locatable minerals on public lands are developed today as the "Mining Law System" rather than as that "antiquated Mining Law of 1872."

Two recent examples are instructive as to how the basic Mining Law System is flexible in meeting modern public land management needs. In 1974, the General Accounting Office (GAO) found that, because of inadequate reporting and recording requirements, federal agencies cannot:

1. Assess exploration activity on federal land.
2. Clear title to lands covered by dormant mining claims without time-consuming and costly actions.
3. Readily identify claimants who have caused environmental or other damage to federal land.

Each of these problems identified by the GAO was resolved by the requirements under the Federal Land ~~Policy~~ and Management Act for mining claimants to file with the BLM location notices, affidavits of annual assessment work and notices before commencing operations.

In 1986, GAO found that the BLM should implement the following two changes in the Mining Law System:

1. The BLM should screen mining claim location notices filed and invalidate those claims located on withdrawn federal lands.

2. The Secretary of the Interior should base his decision on whether to require a reclamation bond on the significance of land disturbance likely to occur and to require mine operators to post a bond in an amount large enough to cover the estimated cost of reclamation.

Without the need for any statutory amendment to the Mining Law of 1872, both GAO recommendations were implemented, the first by a BLM Instruction Memorandum, and the second by Congress in the Interior Department appropriations bill.

The public land management functions of the BLM and Forest Service accommodate the Mining Law System both through the land planning systems and mining law regulation systems of each of those agencies. The BLM and the Forest Service have implemented extremely detailed and comprehensive land planning systems. We have found those land planning programs to have become excessively complicated, excessively documented and to take an excessive number of agency personnel away from their needed day-to-day land management activities.

Congress has, perhaps unintentionally, imposed overly ambitious planning requirements on the BLM and the Forest Service without providing those agencies with sufficient funds for the manpower to comply with those requirements. The result is that agency personnel must be diverted to planning for future land management activities at the sacrifice of being able to handle the needed present land management functions.

Nevertheless, the Mining Law System works within the BLM and Forest Service land planning systems as well as the other resource-using systems.

The most direct land management tools applying to operations carried out under the Mining Law System are the Forest Service and BLM surface management regulations. These regulations incorporate and require compliance with all federal and state laws controlling air quality, water quality and solid wastes, and require reclamation and the protection of endangered species, scenic values and cultural and paleontological resources. Both regulations also incorporate the review requirements of the National Environmental Policy Act.

The National Environmental Policy Act might be called the "umbrella land management tool." The environmental analysis and environmental impact statement procedures under NEPA are applicable both to BLM and Forest Service land planning and Mining Law regulation systems. The mining industry does have a concern about the lengthy procedures required in NEPA review of land planning documents and mining plans of operations and about NEPA litigation brought for the sole purpose of delaying an activity. Nevertheless, these problems are common to all actions involving federal participation and are not unique to the Mining Law System. Notwithstanding this problem of delay, activities carried out under the Mining Law System have been fully integrated into the NEPA system to the same extent as have other resource uses on public lands.

Not only has it been the experience of AMC member companies that the Mining Law System has been integrated effectively with public land planning and management but that is also the opinion of the agencies primarily responsible for administering the Mining Law System. Officials from both the BLM and the Forest Service have stated this year that the Mining Law System works well with public land management for the benefit of the country and for the benefit of the mining industry.

May 1989

The Mining Law of 1872 DOESN'T Need Revision

A Review of the General Accounting Office Report on the Mining Law
By The American Mining Congress
Washington, DC

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I. INTRODUCTION

On March 10, 1989, the General Accounting Office (GAO) transmitted to Congressman Nick J. Rahall II, Chairman, Subcommittee on Mining and Natural Resources, Committee on Interior and Insular Affairs, House of Representatives, a report entitled "Federal Land Management—The Mining Law of 1872 Needs Revision" (GAO Report).[1] The GAO Report is permeated with advocacy statements, biased reports on mining situations, omissions of information necessary for an objective report, lack of understanding of the Mining Law and plain errors. The tone of the entire GAO Report is exemplified by the statement of its results in brief:

> *Neither the act's patent provision nor its annual work requirement ensure that a mineral claim will be developed. Rather, escalating land prices, primarily near expanding communities, resort areas and tourist attractions, have made the act's patent provision an attractive means of acquiring title to valuable land for nonmining purposes.*[2]

This faulty foundation then was built upon by Congressman Rahall's March 8, 1989, news release stating that "valuable federal lands are being transferred [by the Mining Law] out of public ownership for fast food hamburger prices," and that the Mining Law allows "giveaways" and promotes "rank speculation" in public lands.[3] Then, Congressman Rahall's press release and the GAO Report were sensationalized further by newspapers across the country carrying headlines such as:

> *"Mining Claims Just a License to Steal Legally"*[4]
> *"Old Law Permits Developers to Buy U.S. Land Dirt Cheap"*[5]
> *"1872 Law Offers a Golden Chance For a Land Grab"*[6]
> *"Federal Land Sales Assailed as a Giveaway"*[7]
> *"Dirt-Cheap Land to Be Had Via Ancient Mining Law Loopholes"*[8]
> *"'Hamburger' Prices Put on Land in the West"*[9]

Further illustrating the extent to which the GAO Report misled the press and the public is the following totally incorrect statement in one of those newspaper articles:

> *Under the 1872 law, the government has no option but to grant a patent to anyone who files a legitimate claim to prospect for minerals on federal land in the West.*[10]

Although unfortunately characteristic of the treatment of natural resource and environmental issues by some members of Congress and the news media, creating such an emotionally charged atmosphere is a most improper method of dealing with national policy issues, and can lead to policy decisions that are as erroneous as the GAO Report itself and can be very damaging to vital national interests. Therefore, the American Mining Congress (AMC) is compelled to respond to this fusillade of untruths, half-truths, omissions and errors found in the GAO Report and to interject some accuracy and balance into the discussion of the Mining Law issue.

The GAO Report contains many statements attributed to persons, reports of examinations of selected mineral patent sites and other selected sites on which mineral patent applications are pending, and situations in which public and governmental access is said to be prohibited across patented mining claims, without information identifying the documents, persons or sites that were discussed. By letter dated April 3, 1989, AMC requested GAO to provide that information. GAO responded (after an additional request by telephone) with a letter dated April 17, 1989, advising that the requested information supporting the GAO Report is contained in work papers available only to the GAO staff. Therefore, a formal request for the same information was made to GAO by letter dated April 18, 1989, pursuant to 4 C.F.R. Part 81.[11] No response has been received yet. Because GAO did not provide that information for the preparation of this response, it was necessary to attempt to verify and supplement the GAO information by tracing the GAO interviews and site examinations through many claim owners and offices of the Forest Service and Bureau of Land Management (BLM). Although the BLM and Forest Service have been very cooperative, some of those attempts have been successful and others have not.

The GAO Report deals with the annual assessment work and patent provisions of the general Mining Law. The general Mining Law system authorizes, controls and, in some cases, prohibits hardrock mineral[12] exploration and development on public lands of the United States. One of the requirements to hold unpatented mining claims is that $100 worth of qualifying assessment work must be performed each year on or for the benefit of each mining claim.[13] If a mineral deposit is discovered on a mining claim that the claimant proves can be commercially mined, processed and sold at a profit, and if other requirements of the Mining Law are satisfied, a patent conveying fee title to the claim may be issued to the claim owner.[14] This response addresses the annual assessment work and patent provisions of the Mining Law in the order in which they are presented in the GAO Report.

II. ANNUAL ASSESSMENT WORK

GAO recommendation to Congress:

> *We recommend that the Congress amend the Mining Law of 1872 to require claim holders to pay the federal government an annual holding fee in place of the existing annual work requirement. In considering such an amendment, the Congress should bear in mind the relationship of the annual work requirement to the patent provision of the Mining Law of 1872.*[15]

Bases for GAO recommendation and AMC Responses:

A. GAO States: The annual work requirement does not promote development. One hundred seventeen years ago, $100 represented a sizeable annual investment (the equivalent to about 25 days of labor). Today, $100 represents a nominal yearly expense (about an average day's work).[16]

AMC Response: First, it is not clear that the GAO understands how much assessment work is required to hold mining claims. At five places, the GAO Report states, in effect, that "the Mining Law allows claim holders to preserve the rights to their *claims* by performing annually the equivalent of at least $100 worth of drilling, excavating or other development-related work."[17] (Emphasis added.) At no place does GAO acknowledge that the Mining Law requires $100 worth of work to be performed on or for the benefit of each mining claim. Even if GAO does understand the amount of required assessment work and those errors were inadvertent, those statements are misleading to Congress and the public.

In 1872 and in the early years following the enactment of the Mining Law, the principal type of minerals sought were the high-grade small gold and silver deposits exposed at the surface that could be encompassed within a single or only a few mining claims. Since that time, the most easily found high-grade small orebodies have been discovered and worked out by hand labor and with rudimentary forms of equipment then available. The orebodies sought today are generally large in size, disseminated in nature and can be produced only by large mining operations. To establish a property position in the exploration for such orebodies, it is necessary to locate not one or a few claims but tens or hundreds of claims. Therefore, the amount of assessment work at $100 per claim must be multiplied by the increased number of claims necessary to hold such a prospect.

For the preparation of this response, a questionnaire was submitted to 57 mining companies.[18] The 26 companies responding to that questionnaire had located 115,156 mining claims between and including 1983 through 1988. During the same period, those companies relinquished a total of 86,608 mining claims, 34,643 of which were relinquished to save the expense of complying with the assessment work requirements and to apply that money to other claims or projects. The remaining claims were relinquished generally because they were found to have insufficient mineral potential and would have been allowed to expire even if there had been no assessment work requirement. Therefore, it appears that the present $100 per claim required annually for assessment work does promote either present mineral development or the relinquishment of mining claims for later development by others.

B. GAO States: A 1974 GAO study reported that 240 claims located between fiscal years 1948 and 1972 were reviewed for evidence of mineral development, and, on 146 of those claims, no evidence of mineral development work existed. In this GAO Report, it is stated that, more recently, two mining company officials acknowledged that their companies actively were mining relatively few of their many unpatented claims. GAO observed that "all that they must do to preserve their claims is to annually file affidavits with BLM and the respective counties certifying that the required development work was done."[19]

AMC Response: If anything, it is surprising that as many as 94 unpatented claims out of 240 unpatented claims examined in the 1974 study did show evidence of development work. This amounted to 40 percent of the unpatented claims that contain evidence of development work. The 240 claims reported in the 1974 GAO report must have included many claims that had been abandoned, possibly shortly after location. (GAO did not indicate, and it is therefore assumed, that GAO did not investigate whether those claim owners were current with their annual assessment work affidavit filings in the county recorders' offices.) At the time the 1974 GAO report was published, it was estimated that there were six million unpatented mining claims that had been located on the public lands. It was not until the Federal Land Policy and Management Act (FLPMA) was passed in 1976 that there was any requirement for claim holders to verify by filing affidavits or notices in the BLM that their claims still are being held.[20] After the FLPMA recording requirements were carried out, only about 1.7 million (28 percent) of those claims were filed in the BLM and preserved.[21] If only 28 percent of the 240 claims (67 claims) examined by GAO in the 1974 study were being held actively, evidence of development work on 94 claims (more claims than were being held actively) indicates a remarkably high amount of diligence.

Further, while apparently attempting to utilize these numbers from the 1974 GAO report to demonstrate that the assessment work requirement does not promote development, GAO instead demonstrated its lack of familiarity with the Mining Law and mining practices. Considering that tens or hundreds of claims must be located to protect an exploration position on a potential deep-seated low-grade orebody, it does not make sense to conduct exploration or development work on each claim. The Mining Law allows,[22] and it is the practice of the mining industry to conduct, group development work on a few claims to satisfy the assessment work requirements for a contiguous group of claims so long as the value of that annual work equals at least $100 per claim. This allows, for example, deep drilling to occur on some claims to provide extrapolated geologic and development potential information for other claims without disturbing or even touching the surface of those other claims. Therefore, even for claims that are being diligently worked, one should not expect to find evidence of development on each claim.

The GAO's lack of familiarity with the Mining Law also is exemplified by its statement that all firms must do to preserve their claims is "to annually file affidavits with BLM and the respective county certifying that the required development work was done."[23] It is unfortunate that the GAO did not verify the accuracy of this statement with knowledgeable federal agencies or mining industry representatives. Not only must claim holders annually file affidavits with the BLM and the respective counties certifying that the required development work was done, but also that work must, in fact, have been done and must have been of the nature that qualifies as assessment work. Otherwise, any other person may locate claims on the same land and challenge the amount of the work, the nature of the work and its location.[24] There are more than 20 pages of case annotations in United States Code Annotated dealing with challenges to qualifying assessment work.[25] Further, the BLM regulations provide, and when necessary, the BLM enforces the provision, that failure of a mining claimant to comply substantially with the requirement to expend $100 for each claim each year will render the claim subject to cancellation by the United States.[26]

Even the performance, filing and recording of assessment work are not all that a claim owner must do to preserve his claims. In addition, to protect claims against other locators, the claim owner either must be physically occupying and working each claim within a group or have made a "prudent man" type of mineral discovery within each claim not being physically occupied and worked.[27] The prudent man rule requires that minerals have been found within each claim and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means with the reasonable prospect of success in developing a valuable mine.[28] As to the United States government, not even physical occupancy and working or a prudent man discovery will suffice to preserve mining claims. To protect the mining claim against a challenge by the United States, the claim owner must prove that he has discovered a mineral deposit that is of such value that it presently can be mined, removed and disposed of at a profit.[29] In view of the foregoing, it is absurd and inexcusably misleading for the supposedly authoritative GAO Report to state that all that claim holders must do to preserve their claims "is to annually file affidavits with BLM and the respective counties certifying that the required development work was done."

C. GAO States: "We reviewed 100 annual work affidavits filed by individuals and businesses within BLM's California and Arizona state offices in 1987 and concluded, as did the BLM minerals examiner assisting us, that *much* of the work did little to bring the claims any closer to development. Activities reported as meeting the mining law's annual work requirement included maintaining boundary markers and fences, removing litter, posting signs and checking property for vandalism and safety hazards."[30] (Emphasis added.)

AMC Response: It is not certain how much of the work or what kind of work GAO was referring to in concluding that "much of the work did little to bring the claims any closer to development," but the implication is that the phrase, "much of the work," refers to maintaining boundary markers and fences, removing litter, posting signs and checking property for vandalism and safety hazards. It is true that none of those activities would bring the claims any closer to development. However, it is also true that none of those activities qualify as assessment work[31] and reliance upon such work would subject the claims to location by others or invalidation by the United States.

The GAO declined to identify which 100 annual work affidavits were reviewed or the BLM minerals examiner assisting the GAO. However, through numerous inquiries, we found that the BLM minerals examiner referred to by GAO is Mr. James Evans in the California state office of the Bureau of Land Management. Mr. Evans advised us that he did *not* conclude that much of the work reported in the affidavits he examined did little to bring the claims any closer to development. Mr. Evans advised GAO only that many of the forms of affidavits were not adequate but that he could not conclude that much of the work reported in the affidavits did little to develop the claims.[32]

Not having the luxury of time as was available to GAO in the preparation of its report (using more than eight members of GAO's staff working from late 1987 to March 1989), the preparers of this response could not travel to the California BLM state office to review affidavits there. However, we did review 50 affidavits from the Arizona BLM state office that were selected in the same manner as the GAO selected the affidavits it examined.[33] Only two of those 50 affidavits reviewed relied exclusively upon work that may not qualify as assessment work.[34]

D. GAO States: Forest Service and BLM officials advised that attempting to verify the $100 annual work requirement for all or even a sample of unpatented mining claims would not be an efficient use of their limited resources. Because they are not required to, and because of the problems associated with verification, neither the BLM nor the Forest Service requires verification of the annual work requirement except when a claim holder intends to conduct operations that will disturb the land, patent the claim or when a federal agency needs the land for another purpose. Even if BLM is successful in invalidating a claim, GAO states that the claim holder immediately can refile another claim on the same location, thus regaining the right to extract and sell minerals.[35]

AMC Response: The inference left in this portion of the GAO Report is that the impracticability of the Forest Service and BLM verifying that all assessment work has been performed creates problems. It should be noted, however, that the GAO Report does not state that BLM or the Forest Service identified any such problems and none were identified by GAO. One is left wondering what the problems are. The public land occupied by any portions of a mining claim on which operations are not being carried out remains available for the same uses by the public and the same uses and management by federal agencies as if the claim were not there. The Multiple Surface Use Act of 1955[36] expressly requires that any surface of unpatented mining claims not being operated remains subject to the right of the United States to manage that surface and to the right of the public to use the surface for any authorized purposes, including access to adjacent public lands, hunting, fishing and recreation.[37] So, if surface operations have not been proposed or no application for a patent has been made, there is no need for federal agencies to verify whether assessment work has been done.

One of the virtues of the assessment work requirement of the Mining Law is that it is self-executing and does not require a force of federal inspectors to investigate and verify compliance with the statute. So long as a claim holder is serious about holding his claim, he must assure that the required assessment work is done properly. Otherwise, the land within the mining claim is available to anyone else who is more interested in developing the claim.[38] Contrary to the statement by GAO,[39] if BLM has withdrawn the land for nonmining uses and is successful in invalidating a claim for failure to meet the assessment work requirements, the claim holder cannot refile another claim on the same location and thus regain the right to extract and sell minerals.[40] If BLM does not need the land and has not withdrawn the land for other uses, there is no need to invalidate a claim for failure to perform assessment work or for any other reason.

E. GAO States: "In some instances, however, claim holders have scarred the land needlessly with bulldozers to make it appear they have complied with the annual work requirement even though this did nothing to further development of the minerals."[41] Although speaking of these situations in plural, GAO cited only one instance "in Laughlin, Nevada, [where] we found numerous bulldozer scrapes that the claim holder told us were made only to meet the work requirement rather than to bring the claim any closer to mineral development."[42]

AMC Response: Although, again, GAO declined to identify the mining claims or claim holders referred to in this statement, the AMC identified that information after making numerous inquiries through other federal agencies. The holders of placer mining claims located approximately two to three miles southwest of Laughlin, Nevada (not "in Laughlin, Nevada"), advised that persons from GAO accompanied the claim holders on a visit to the claims in May 1988. The claim holders advised that they did not tell the GAO representatives that the excavations were made only to meet the work requirement rather than to bring the claims any closer to mineral development. Instead, the claim holders told the GAO representatives that they had taken mineral samples from these particular excavations. The claim holders later had those samples assayed for their mineral content.[43]

Claim holders must notify the BLM or the Forest Service before they conduct operations that could result in significant surface disturbance.[44] If it is determined that the method of exploration, such as with bulldozers or other inappropriate surface disturbing activities, needlessly would scar the lands, the BLM or the Forest Service can halt the activity.[45]

F. **GAO States:** The annual work requirement should be replaced with an annual holding fee that would: (1) make it unnecessary for claim holders to certify that they have met the annual filing requirement, (2) eliminate a requirement that federal agencies believe would be difficult to enforce, (3) depending on the amount of the fee, likely result in clearing more invalid, inactive or abandoned claims from the records and make those claims available to others, and (4) reduce damage to federal land by claim holders who are trying to make it appear they have complied with the annual work requirement.[46]

AMC Response: GAO has not established that any one of these goals that GAO says would be accomplished by an annual holding fee is necessary. There has not been any problem established by GAO with claim holders certifying that they have met the annual work requirement. There has not been any problem established by GAO with federal agencies not enforcing the assessment work requirement when there is no need to, and when there is a need to, federal agencies enforce the requirement. There is nothing to be accomplished by clearing more inactive or abandoned claims from the records except when another party becomes interested in the development of the land and then that party has the opportunity to relocate any claims with respect to which there has been a failure in assessment work. Finally, GAO has not established that claim holders damage federal lands by trying to make it appear that they have complied with the annual work requirement. Investing money in the exploration and development of mineral resources benefits the United States by providing the mineral supplies necessary for our economy and national defense. Placing that money in the federal treasury may appeal to GAO and the Congressional Budget Office[47] but that does not explore and develop those mineral resources.

In its conclusions that the annual work requirement should be replaced with an annual holding fee, GAO cautions that claim holders simply may patent their claims to avoid paying the annual holding fee.[48] This statement is a prime example of GAO's lack of understanding of the extensive requirements to obtain a mineral patent that are discussed in the next section.

III. MINING LAW PATENT SYSTEM

The discussions in the GAO Report regarding the issuance of mining claim patents are the most inflammatory, misleading and biased portions of the GAO Report. Illustrative of those statements is the following:

> *Escalating land prices, primarily near expanding communities, resort areas and tourist attractions, have made the act's patent provision an attractive means of acquiring title to valuable land for nonmining purposes.*[49]

It is such statements as these that appear to have been intended, and that actually were used, for media sensationalism that cast serious questions on the credibility of and motivation for the GAO Report. Before addressing the specific GAO recommendation for Congress to eliminate the Mining Law patenting system and the specific bases for that recommendation, it will be helpful to address GAO's general discussions of the patent system.

The GAO Report states that, through the patent provision of the Mining Law, the government has sold about 3.2 million acres of land and, apparently to dramatize the size of the area, compares that area to the size of the state of Connecticut (the third smallest state in the Union).[50] If one cares to be less dramatic about the relative size of this patented area, it may be considered that 3.2 million acres: (1) is less than one third the size of a single county in Arizona (Coconino County contains 11.9 million acres), (2) is 0.14 percent of the entire land area of the United States, (3) is 2.9 percent of all lands that have been patented by the United States, and (4) is one-seventh of the land occupied by highways and one-half of the land occupied by airports in the United States.

There is some uncertainty concerning the data GAO used for the number of acres patented between January 1, 1978, and September 30, 1987. The GAO figures on the map shown on page 13 total 134,846 acres. The figures shown on page 12 total 150,000 acres and the amount stated on pages 5, 23 and 42 is approximately 157,000 acres. Whichever number is correct, more than one-half of that number (91,000 acres) was patented for minerals (oil shale and common varieties) that can never be located and patented again. This leaves, at the most, only 66,000 acres patented over a period of nine years and nine months for minerals that remain subject to the Mining Law.

Ironically, the reason that more than one-half of the 157,000 acres could have been patented is not due to the present Mining Law but, rather, to a quirk in the Mineral Leasing Act. The only oil shale claims that can be patented are those located before 1920. In 1920, oil shale became a leaseable mineral and no longer could be located under the Mining Law.[51] Further, because oil shale cannot be commercially produced at a profit under present technology and prices in order to meet the marketability test under the Mining Law, even pre-1920 oil shale claims could not be patented today except for the savings clause in the Mineral Leasing Act,[52] which the Supreme Court found recognizes oil shale as a valuable mineral satisfying the discovery requirement without meeting the present marketability requirement of the Mining Law.[53]

GAO stated that, while the purposes of the Mining Law of 1872 were to promote domestic mineral exploration and development and spur the settlement of the then sparsely populated West, the subsequent population growth experienced by many western states has made the latter purpose no longer an issue.[54] While that statement is true, GAO implies that patenting under the Mining Law continues to be used to settle the West. That implication is not true.

At one time, mining claim patents were granted liberally upon a showing of a mineral discovery pursuant to the prudent man test. Even the prudent man test itself was applied very liberally in the early part of this century when more attention was paid to the accuracy of the cadastral land survey than to any determination of whether or not minerals had in fact been found.[55] However, the pliability of the Mining Law has allowed it to keep pace with modern social and policy trends. With the gradual development of the marketability test, which became firmly established in *United States v. Coleman*,[56] the requirements to patent a mining claim have become incomparably more onerous. Simply stated, the marketability rule of mineral discovery requires, in order to obtain a patent, that the deposit is of such value that it can presently be mined, removed and disposed of at a profit.[57]

As simply stated as the marketability rule may be, its application in the patent process is the ultimate of complexity. The verification required by the United States to qualify for a mineral patent may be illustrated best by a case example of a patent issued this year for mining claims for a large silver and copper deposit in Montana. Even though the existence of the ore deposit was recognized by the Forest Service and BLM, this did not cause any leniency to be exercised in the patent process. Exploration on this claim commenced in 1962 and continued through 1983. The Forest Service was advised in March 1982 of the claim owner's intent to file an application for a mineral patent. The Forest Service advised the claim owner that the drill logs and assays must document the physical encounter of ore within each mining claim at an average recoverable value per ton sufficient to pay for all mining and processing costs, including capital, reclamation and environmental protection expenditures. The claim owner was required to notify the Forest Service prior to the time when each drill hole would make ore intercepts. The Forest Service observed the core being pulled from the drill holes, sealed core boxes at the drillsite, was notified when the core would be transported to the logging and splitting site, and had a geologist present at that site to examine and photograph the core and make his own logs. The Forest Service obtained samples from each ore zone for its own assaying.

Patent applications were submitted for 105 mining claims in May and June 1984. The patent applications and supporting documentation consisted of one and one-half feet of materials. The patent applications, supporting documentation and mineral samples were examined and the formalities of the patent process were carried out until March 1989, when a patent was issued to 99 claims. Even with the extent of the documentation and proof of mineral discovery, the Forest Service and BLM rejected the applications for six claims that contain silver and copper ore but not enough, according to the Forest Service, to meet the marketability test. In this process, the claim owner expended more than $7.3 million in establishing the mineral discoveries and obtaining the patent. Those costs worked out to more than $4,038 per acre. In addition, the Forest Service reserved from the patents an easement for a road and trail over the patented claims.

Contrary to the impression left by the GAO that, if the annual work requirement is replaced with an annual holding fee, the claim holders may simply attempt to patent their claims to avoid paying the fee,[58] a decision to apply for a mineral patent should not be made lightly. In addition to the costs for proving a mineral discovery and for the patent process, making an application for a patent can place the claim holder in a win-all or lose-all situation. Since 1960, it has been the policy of the Department of the Interior to bring a contest to have a claim declared void if the patent application for the claim is rejected for lack of a mineral discovery.[59] The probability of the United States prevailing in a contest to invalidate a mining claim for which a patent application has been disapproved or for any other reason is approximately 90 percent.[60]

It was acknowledged by an official of the BLM as early as 1965 that mineral patents are no longer easy to come by. H.R. Hochmuth, who was then the Associate Director of BLM, stated:

> *There can be no gainsaying that the Mining Law of 1872 is not administered as it was originally written and intended. There has been a definite trend in decisions toward more stringent requirements to establish the validity of a claim. The requirements are innovations that have been superimposed on the basic law by the need for standards that can serve to prevent the subversion of the law for nonmineral purposes. Examples of these may be found in the narrowing application of the rule of discovery, the employment of the rule of marketability, the definitions of 'common varieties' and the concern for economic values . . .*[61]

The effect of these developments in the patent requirements of the Mining Law resulting in the drastically declining number of mineral patents being issued, and the absurdity of GAO concluding that the patent provision is an attractive means of acquiring valuable land for nonmining purposes, are illustrated on the graph shown on the following page.

GAO recommendation to Congress:

> *We recommend that the Congress amend the Mining Law of 1872 to eliminate the patenting of both hardrock minerals and the land required to mine them. This change not only would permit the land to remain under federal ownership, but also it would provide the government with the opportunity in the future to collect revenues for the hardrock minerals extracted.*[62]

Bases for the GAO recommendation and AMC Responses

A. GAO States: The patent provision of the Mining Law is not consistent with public land policies.[63] In reaching this conclusion, the GAO found that a number of laws have been enacted to accommodate mining while also requiring that the federal government retain title to the land, citing as examples the Alaska National Interest Lands Conservation Act of 1980,[64] the Military Lands Withdrawal Act of 1986,[65] the Mineral Leasing Act of 1920,[66] the Materials Act of 1947,[67] the Common Varieties Act of 1955[68] and the Federal Land Policy and Management Act (FLPMA).[69]

AMC Response: Some of these statutes did modify the patent provision of the Mining Law selectively with respect to certain lands and certain minerals. However, with this deliberate selective modification of the Mining Law by Congress, it is difficult to understand how GAO could reach any conclusion other than that Congress did confirm the patent provision of the Mining Law as national policy with respect to the remaining lands and minerals not affected by those statutes.

The GAO Report also states that the patent provision of the Mining Law is contrary to FLPMA establishing the new general federal policy that public lands shall be retained under the stewardship of the federal government unless disposal is in the national interest.[70] While it is true that a statement of general policy for public land retention is found in FLPMA,[71] the GAO Report neglects to mention that the same section of FLPMA states that this general policy and the other policies set forth become effective only as specific statutory authority for their implementation is enacted.[72] Contrary to there being any indication in FLPMA or its legislative history that the patent provision of the Mining Law is inconsistent with national policy, Congress deliberately considered the Mining Law patenting provision and clearly confirmed and ratified its continuation without change.[73]

B. GAO States: The patenting of mining claims is not consistent with the principles of multiple use and sustained yield under FLPMA. Once land is patented, the responsible federal agency loses control over the management of the land, which can limit the agency's ability to effectively manage adjoining public land.[74]

AMC Response: GAO should not limit its disdain for private ownership of land to mining claim patents. At that same early time when a few million acres were being patented for mining claims, hundreds of millions of acres left the public domain through patents for homesteads, railroad grants, state land grants, townsite grants, Recreation and Public Purposes Act grants and other grants.[75] As discussed above, the current standards for issuing a patent to a mining claim almost guarantee that a mine will be developed on the patented land. Of course, it is difficult for there to be true multiple use by the public of land containing a mining or milling operation that would be a hazard to the public and a liability to the claim owner. Certainly, GAO does not contend that there could be or should be true multiple use for the public and federal agencies over lands containing active mining operations.

C. GAO States: A federal agency cannot infringe upon patent holders' property rights and patent holders deny federal agencies and recreational users permission to cross their lands.[76]

AMC Response: The GAO cited only two examples to establish its point that owners of patented mining claims deny the federal agencies and the public access to other public lands. The two cases cited by GAO could not have been poorer examples of the point it was attempting to make. If valid examples are available, GAO did not mention them. With respect to one case, GAO stated:

> *For example, the* patentholder *of one site we visited near Aspen, Colorado,* had a locked gate *blocking the* only *access road to considerable Forest Service land and many other mining claims, thus precluding recreational users and miners from crossing his lands to adjoining Forest Service lands.*[77] *(Emphasis added)*

The only information the preparers of this response were able to obtain from the GAO concerning the entire GAO Report was that this site referred to on page 23 as being near Aspen, Colorado, is the land contained in the patent issued to Pitkin Iron Corporation listed on page 43 of the GAO Report.[78] The GAO investigators apparently were content with proving their point by merely observing a locked gate on a road over patented mill sites leading to a national forest. One would think that the natural course of action for an investigative agency to follow would be to inquire about the circumstances involving the road and the locked gate. Upon such inquiry, it would have found that the patent to these mill sites contains the following reservation:

> *Reserving an easement and right-of-way for public access and use by the people of the United States, generally, of the existing Cooper Basin Road No. 121 over and across the Cooper and Star Mill sites . . .*[79]

This reservation from the patent should suggest to an investigator that the claim owner may have no authority to place a locked gate on Cooper Basin Road. This should lead to further inquiry about why the locked gate was there. This inquiry was made by the preparers of this response speaking with the Forest Service District Ranger of the Aspen Ranger District having jurisdiction over this area. The District Ranger advised that the Cooper Basin Road has been closed by the Forest Service and the closure consists of a Forest Service gate and lock. The Forest Service closed the road in about 1979 for land management requirements because a National Forest area beyond the road is designated as semi-primitive and the road is designated for non-vehicular travel only. However, the District Ranger advised that, rather than Cooper Basin Road being closed to recreational users as reported by GAO, it is available for hikers, skiers, mountain bicyclists and other recreational users. Further, rather than this locked gate blocking the "only access road to considerable Forest Service land, "as reported by GAO, the District Ranger advised that there is a jeep road two miles on one side and another jeep road two and one-half miles on the other side of Cooper Basin Road that are not closed and that make public vehicle access available to the areas that have not been closed as semi-primitive by the Forest Service.[80]

The second and only other example cited in the GAO Report of patented mining claims blocking access to federal lands is described by GAO as follows:

> *Similarly, Park Service officials in Alaska told us that a patent holder recently denied Park Service staff permission to cross his land to conduct work related to an environmental impact statement on nearby unpatented claims. In other cases in which illegal activities such as poaching are suspected, Park Service officials informed us that they do not always investigate because they may lack just cause to trespass on private land.*[81]

AMC Response: There is more of a fragment of accuracy in this situation than existed in the Aspen, Colorado, situation. It is true, as stated by GAO, that a claim owner in Alaska has denied Park Service staff permission to cross his land. However, GAO did not tell "the rest of the story."

For the past several years, relations between owners of patented and unpatented claims and Park Service officials in Alaska have not been smooth and there have been numerous instances in which Park Service officials have restricted or prohibited operations on both patented and unpatented claims and have restricted or prohibited access to those claims even over state highways and roads not on Park Service land. As stated by the court in *United States v. Weiler* in which the Park Service caused a claim owner to be convicted for clearing a claim validity examination site: "Understandably, there exist strong feelings between [Park Service] persons who favor land conservation for park use and those who support mining or other forms of land use within the park and preserve boundaries."[82]

These circumstances form the background to the Park Service situation described on page 24 of the GAO Report. Through Park Service channels, after GAO declined to provide this information, the preparers of this report determined that the Park Service official referred to in the GAO Report is Mr. Floyd Sharrock in the Anchorage, Alaska, Park Service office. Mr. Sharrock stated that he had discussed a patented claim access problem with GAO investigators and that the claim owner he referred to is Mr. Leo Mark Anthony, who resides in Anchorage, Alaska.[83] Mr. Anthony advises that the Park Service at first required him to obtain a permit each day to travel on a state road to his patented mining claims. This permit was changed to an annual permit that restricts Mr. Anthony from supplying his mine or transporting ore from his mine to the hours between 10 p.m. and 7 a.m. in any vehicle larger than a pickup truck. In another instance, Mr. Anthony advises that Park Service employees crossed his patented claims with a bulldozer without his consent, causing damage to his road.[84] Therefore, it is true that Mr. Anthony, under these circumstances, has denied the Park Service access over his patented claims. However, it is unfortunate both that this situation in Alaska has developed and that GAO chose this unique situation as an example of a supposed general problem.

If all else fails with federal agencies and mining claim owners cooperatively arranging for rights of access across patented mining claims actually obstructing passage to public lands, federal agencies may resort to the Unlawful Enclosures Act.[85] The Unlawful Enclosures Act prohibits any enclosure of public land to exclude the public, federal officials or wildlife from passing to those lands[86] even if the enclosure is all on private land[87] and even if the enclosure results in part from a fence and in part from natural barriers.[88]

D. GAO States:

> *Since the mining law's enactment, patented land throughout the West has been used for many different, nonmineral purposes, including housing projects, mountain cabins, and resort sites. . . . An official of BLM's Colorado State office estimates that up to 80 percent of the patent applications he receives are motivated primarily by uses other than mining.*[89]

AMC Response: As mentioned above, the patenting and use of mining claims for nonmining purposes at one time, may have been a valid criticism of the patenting provision of the Mining Law, but it is not a valid criticism today. What is particularly disturbing about the above GAO statement is that it attempts to relate early abuses of the patent system to current occurrences by referring to an unidentified BLM official's statement. Because GAO declined to identify that BLM official, it was necessary for the preparers of this response to locate in the Colorado state BLM office the three officials who were interviewed by GAO and who are responsible for adjudicating patent applications. Each of those three officials were interviewed by AMC and each said that he or she has never seen patent application circumstances that would appear to be motivated for uses other than mining.[90] Mr Richard Tate, Chief of the Mining Law, Solid Minerals Adjudication Section, advised that, because he had been aware earlier of the above-quoted statement in the GAO Report, he and his staff made informal inquiries in the Colorado state BLM office and could not find anyone who had made such a statement.[91] Therefore, whether this statement was made and, if made, what its basis was cannot be verified. Its use in creating any foundation for the GAO Report is highly questionable.

E. GAO States: For the purpose of determining whether patented claims are being developed, GAO asked BLM's western state offices to identify all patents issued in fiscal year 1983. GAO selected that year "to provide the patent holders sufficient time to begin mining operations before GAO's review." Then GAO identified seven patents issued during that year and 13 other nearby sites patented after 1970 that could be visited in conjunction with the seven sites identified. To determine whether the federal government was obtaining a fair market return for public lands being disposed of, GAO estimated the values of the 20 patented sites.[92]

AMC Response: It appears, therefore, that GAO used two stated criteria and one unstated criterion for identifying the patented mining claims studied. One stated criterion for selecting the seven patent sites was that they had to have been patented in fiscal year 1983 in order, according to GAO, for there to be enough time for the claimants to begin mining operations by the time of the visits in calendar year 1988. The other stated criterion was that the 13 other patent sites selected were in the areas of the first seven selected. The criterion that was not stated was how the locations for the first seven patent sites were selected.

GAO did not identify the number of patents issued during fiscal year 1983 from which it selected the seven sites; however, Table 1.4 on page 42 of the GAO Report shows that 150 patents were issued during calendar year 1983. Therefore, it should be reasonable to assume that GAO had more than 100 patents from which to select the seven. Six of the seven patents selected were near metropolitan areas, retirement communities or resorts (only the patent site near Searchlight, Nevada, was not near one of these type of communities, being about 40 miles from Las Vegas.) This caused the remaining 13 patent sites selected for the study to also be near those types of areas.(See Appendix A). It stretches credulity to believe that the seven selected patent sites that formed the basis for the 20 patent sites studied are representative of the locations of the more than 100 patents issued in 1983. In fact, GAO declined to follow the suggestion of the California BLM minerals examiner to visit some of the major operating gold mines in California rather than to limit their California investigation to the three single patented claims near what GAO referred to as the popular tourist and retirement communities of West Point, Jackson and Sonora, California.[93]

To support its proposition that patents are being obtained for real estate value rather than for mining purposes, GAO considered two elements: active or inactive status of mine operations and estimated real estate values of the areas. GAO listed 13 of the patent sites as inactive and only seven as active.[94] Two of those sites listed as inactive (the Batesel and Gornowich sites) were being produced within the range of time that spanned the GAO study.[95] Of the remaining 11 sites, the following nine had been active at some time and presently contain obvious mine workings or mineral processing facilities: Phelps Dodge, Melluzzo, Bunkowski (three sites), Yeager, Pitkin, Graham and Marquis.[96]

Further, the representatives were advised that the Hinton-Keystone Site was not being mined because Summit County, Colorado, had adopted a zoning ordinance prohibiting mining.[97] Therefore, 19 of the 20 patent sites cannot support the proposition for which they were used by GAO—that they were patented for nonmining purposes.

Because GAO concentrated the selected patent sites near metropolitan areas, GAO created another problem with its statistics that it did not acknowledge. A result of selecting patent sites near metropolitan areas was that eight of the 20 sites were patented for common variety minerals.[98] Each of the mining claims for those patent sites was located before 1955 for sand, gravel, or granite.[99] After the Common Varieties Act of 1955[100] was enacted, these claims could not have been located validly and patented. Therefore, it is hardly becoming for GAO to use these sites as being illustrative of the problems with patent provisions of the Mining Law today. Further, of the total estimated values of patent sites reported by GAO ranging from a low of $13,792,000 to a high of $47,962,000, those figures would be $3,959,000 and $33,547,000, respectively, if the common varieties patents were excluded.

F. GAO States: As of October 1, 1987, applications for 265 patents were pending for more than 80,000 acres of land in the western United States and Alaska. GAO visited 12 of those 265 patent application sites and stated that "if all of the lands in these 12 sites is patented, the government will receive about $16,000 for land appraised in 1988 at between $14.4 million and $47.1 million."[101]

AMC Response: Again, the methodology used by the GAO assured that these patent application sites were located near metropolitan or resort areas. Further, because GAO did not explain the circumstances involved in these patent applications, the impression is left that the applications likely would be granted. Otherwise, those massive dollar amounts cited by GAO should have been highly qualified. GAO made a point of providing special discussions and photographs of some of those patent application sites.

Because of the emphasis given by GAO to those sites, this response will address the circumstances surrounding them.

The two patented application sites near Breckenridge, Colorado, were illustrated by two color photographs showing a skier in the foreground and a ski area in the background.[102] GAO was advised by the Forest Service at the time of its visit to those sites that the Forest Service had determined that those mining claims were not qualified for patent and the claims were being contested to confirm that determination.[103] The GAO did not acknowledge its awareness of that fact and assumed the sites would be patented.

GAO discussed lands near Laughlin, Nevada, that were included in a patent application and that were described as being near the county's fastest growing gambling area, and "conveniently located" for water sports activities on the Colorado River.[104] GAO provided no indication that this patent application would be subjected to the close scrutiny under the marketability test or that the BLM would conduct careful examinations of the mineral discoveries on the claims. Having become aware of this, the claim owners withdrew these patent applications on April 17, 1989.[105]

On page 35, GAO discussed the site for a patent application described as being near the Glenwood Springs, Colorado, golf course. GAO did not acknowledge that its representatives were advised by the BLM at the time of their visit that this patent application could not be approved. BLM advised GAO that, even through the patent applicant was sincere in his believing there were valuable minerals in his claim, his belief was based largely on his use of a divining rod and insufficient evidence of mineralization had been provided with the patent application. Instead, GAO assumed that this site would likely be patented. This patent application was withdrawn in July, 1988, seven months before the GAO Report was published.[106]

Three-hundred-thirty acres of the 760 acres in the ASARCO patent application have been withdrawn because the BLM has determined the mill sites were not valid.[107] All of the Anamax patent applications for 330 acres of land have been withdrawn.[108] The Tognoni patent application presently is being contested through formal proceedings in the BLM.[109] The patent applications for the remaining four sites (Onanon, Superior, Hasse, Great Star and Commercial) are presently undergoing or will undergo mineral examinations to determine their validity for patent.[110]

It is possible, of course, that a few of the patent applications discussed by GAO will be granted. It is totally inappropriate, however, for GAO to leave the reader with the impression that most or all of the patent applications it discussed will be approved when the GAO representatives knew that this was probably not the case.

IV. CONCLUSION

This GAO Report may be unprecedented among the works of the United States General Accounting Office in its lack of objectivity and valid supporting facts. In what appeared to be a preordained agenda with the conclusions of the study established before it started, GAO concluded that the Mining Law assessment work requirement should be replaced with cash payments to the federal government, and that the mineral patent system should be abolished. This response has established that every one of the supporting bases used by GAO to reach these conclusions is either conceptually invalid, in plain error, or factually and fatally incomplete. On the other hand, this response does establish that the present assessment work requirement does promote mineral development on public lands and the patent provisions of the Mining Law are not abused in today's Mining Law system.

The ramifications of this GAO Report extend even beyond the subjects covered in that report. The limited amount of time that members of Congress have available to spend on individual issues, such as the Mining Law, requires that they must rely upon competent and objective sources of advice, as should be expected from GAO. If these sources of objective advice and information fail, as has occurred in this GAO Report, very serious errors in national policy decisions and lawmaking can result. Not only is this GAO Report totally discredited, but it establishes that Congress should be very hesitant in even utilizing GAO reports in considering legislation, at least on the subject of the Mining Law, and any that may be utilized, should be considered only with great skepticism.

—May 16, 1989

[1] General Accounting Office, *Report to the Chairman, Subcommittee on Mining and Natural Resources, Committee on Interior and Insular Affairs, House of Representatives*, GAO/RCED-89-72 ("GAO Report").

[2] GAO Report at 3.

[3] Rahall, News Release, "Mining Law Being Used for Land Speculation, Land Grab Near Ski Resorts and Gambling Casinos, Mining Subcommittee Chairman Rahall Calls For Reform," House of Representatives, March 8, 1989.

[4] *The Portland Oregonian*, April 2, 1989.

[5] *San Francisco Chronicle*, March 9, 1989.

[6] *Chicago Tribune*, March 26, 1989.

[7] *The New York Times*, March 13, 1989.

[8] *County Telegram Tribune*, San Luis Obispo, CA, March 15, 1989.

[9] *The Arizona Republic*, March 10, 1989.

[10] *See supra* note 7. *See infra* discussion accompanying notes 27-29, 56-61 on the requirements to obtain a mining claim patent.

[11] 4 C.F.R. Part 81 consists of the regulations providing for Public Availability of General Accounting Office Records.

[12] Those minerals generally referred to as "hardrock minerals," which are subject to the Mining Law, include all valuable inorganic substances generally regarded as minerals excluding those particular minerals which have been removed from the Mining Law. Those excluded minerals are the fossil fuel minerals (oil, gas, coal, oil shale, native asphalt, solid and semi-solid bitumen and bituminous rock), fertilizer and chemical minerals (phosphate, potash, sodium and, in Louisiana and New Mexico only, sulfur), geothermal resources and all common varieties of sand, stone, gravel, pumice, cinders and clay, all of which may be explored for and developed on public lands under various mineral leasing systems.

[13] 30 U.S.C. § 28.

[14] *Id.* § 29.

[15] GAO Report at 21.

[16] *Id.* at 18.

[17] *Id.* at 11. *See also Id.* at 2, 18 and 21.

[18] Letters dated April 5, 1989 to 57 small and large hardrock mineral mining companies operating in the public land states.

[19] GAO Report at 18.

[20] 43 U.S.C. § 1744.

[21] U.S. Department of the Interior Bureau of Land Management, Mining Claim Recordation Status Report for the Fourth Quarter, fiscal year 1983.

[22] 30 U.S.C. § 28.

[23] GAO Report at 18.

[24] 30 U.S.C. § 28.

[25] *Id.* Annotations 201-312.

[26] 43 C.F.R. § 3851.3.

[27] 2 American Law of Mining § 34.03 (2d ed. 1984).

[28] *Id.* § 35.11[1].

[29] *Id.* § 35.12[1].

[30] GAO Report at 18.

[31] *See* 2 Am. L. of Mining § 45.04[4] (2d ed. 1984).

[32] Telephone interview with Mr. James Evans on April 25, 1989.

[33] The GAO selected each fiftieth affidavit filed with the BLM in 1987 until it had selected fifty affidavits. GAO Report at 15.

[34] One of the 2 affidavits relied exclusively upon dewatering a mine shaft for assessment work. It is an unanswered question of law whether this work would qualify.

[35] GAO Report at 19.

[36] Act of July 23, 1955, 69 Stat. 368, 30 U.S.C. §§ 611-615.

[37] *Id.* § 612.

[38] *See* 30 U.S.C. § 28.

[39] GAO Report at 19.

[40] 2 Am. L. Mining, § 45.07[2][b] (2d ed. 1984).

[41] GAO Report at 19.

[42] *Id.* at 20.

[43] The samples were assayed by Bateman Metallurgical Laboratories in Sparks, Nevada. Telephone interviews with Mr. John Diepenbrock and Mr. J. M. Edgar on April 25, 1989, confirmed by letter dated April 26, 1989.

[44] 43 C.F.R. § 3809.1, 36 C.F.R. § 228.4.

[45] *United States v. Richardson*, 599 F.2d 290 (9th Cir. 1979).

[46] GAO Report at 21.

[47] *Id.*

[48] *Id.*

[49] *Id.* at 3, 40.

[50] *Id.* at 22.

[51] *See* 30 U.S.C. § 181.

[52] *Id.* § 193.

[53] *Andrus v. Shale Oil Co.*, 466 U.S. 657 (1980).

[54] GAO Report at 24.

[55] Strauss, "Reflections on the Interior Department's Administration of the Mining Law," 74 *Columbia Law Review* 1231, 1261 (1974).

[56] 390 U.S. 599 (1968).

[57] 2 Am. L. Mining § 35.12[1] (2d ed. 1984).

[58] GAO Report at 21.

[59] *United States v. Carlile*, 67 I.D. 417 (1960).

[60] Leshy "The Mining Law," 263 (1987).

[61] Hochmuth "Government Administration and Attitudes in Contests and Patent Proceedings," 10 *Rocky Mt. Min. L. Inst.*, 467, 473 (1965).

[62] GAO Report at 41.

[63] *Id.* at 22.

[64] 16 U.S.C. § 410hh *et seq.*,

[65] Public Law 99-606.

[66] 30 U.S.C. §§ *et seq.*

[67] *Id.* §§ 601 *et seq.*

[68] *Id.* § 611.

[69] 43 U.S.C. §§ 1701 *et seq.*

[70] GAO Report at 22.

[71] 43 U.S.C. § 1701(a)(1).

[72] *Id.* § 1701(b).

[73] The Senate Committee on Interior and Insular Affairs had proposed that any mining claim recorded under the provisions of FLPMA for which the claimant had not made a patent application within ten years after the date of recordation would be conclusively presumed to be abandoned and void. S. Rep. No. 561, 94th Cong. 1st Sess. 66 (1975). However, the conference report on the FLPMA legislation specifically considered and rejected this proposed amendment to the patent provisions of the Mining Law. H. Rep. No. 1724, 94th Cong. 2nd Sess. 62 (1976). A clearer confirmation that the Mining Law patent system remains a public land policy could not be imagined.

[74] GAO Report at 23.

[75] U.S. Department of the Interior, "Public Land Statistics 1987" (1987).

[76] GAO Report at 23, 24.

[77] *Id.* at 23.

[78] Telephone conference on April 12, 1989, with Mr. Robert W. Wilson, Assistant Director, Natural Resources Management Issues, United States General Accounting Office.

[79] United States Patent No. 05-83-007, Mineral Survey Number 20896, dated March 30, 1983.

[80] Telephone conference on April 19, 1989, with Ms. Gretchen Merrill, Forest Service District Ranger, Aspen Ranger District, Aspen, Colorado, confirmed by letter dated April 20, 1989, to Ms. Merrill.

[81] GAO Report at 24.

[82] For example, bulldozing a trench across a patented claim owner's private landing strip (telephone conference on May 2, 1989, with Reverend J. Michael Hornick, Anchorage, Alaska); seeking to enjoin the access of a claim owner over an existing state road to reach his patented claims (Minutes of the Alaska Land Use Council meeting on May 8, 1987, at 5); having criminal charges brought against and causing the conviction of an unpatented claim owner for clearing a mineral discovery site, allegedly with the verbal permission of the Park Service, for a claim validity examination (*United States v. Weiler*, Memorandum Decision, Case No. A88-029 Cr., United States District Court for the District of Alaska, March 20, 1989). There was also an incident in 1988 in which the Park Service, with the assistance of a U.S. Army demolition team, blew up a mill and historic mine buildings on an inholding owned by the

University of Alaska in the Denali National Park which incident, the Park Service claims, was an accident. (*The Anchorage Times*, September 1, 1988)

[83] Telephone conference with Mr. Sharrock on April 28, 1989.

[84] Telephone conference with Mr. Anthony on May 2, 1989.

[85] 43 U.S.C. §§ 1061-1066.

[86] *Id.* § 1061.

[87] *United States v. Lawrence*, 848 F.2d 1502 (10th Cir. 1988).

[88] *Stoddard v. United States*, 214 F. 566 (8th Cir. 1914).

[89] GAO Report at 24.

[90] Telephone interviews with Richard Tate, Betty Mingus and Ralph Spengler, Colorado state BLM office, May 2, 1989, and confirmed by letter dated May 2, 1989, to Mr. Tate.

[91] *Id.*

[92] GAO Report at 15.

[93] *Supra* note 32.

[94] GAO Report at 43.

[95] Telephone conference with Larry Steward, Reno BLM office, April 14 and 18, 1989.

[96] Melluzo: telephone conference with Alan Rabinoff, BLM Phoenix office, April 11 and 14, 1989. Bunkowski and Yeager: telephone conference with Larry Steward, Reno BLM office, April 14 and 18, 1989. Graham and Marquis: telephone conference with Jim Evans, BLM Sacramento office, April 19, 1989. Pehlps Dodge: meeting between GAO representatives and Jerry L. Haggard, March 23, 1988. Pitkin: *See infra* note 97.

[97] Telephone conference with Ted Mullins, Region Two Forest Service Group Leader-Mining Law Administration, May 5, 1989.

[98] Telephone conferences with Alan Rabinoff and Tom Reitmeyer, Phoenix BLM office, April 11 and 14, 1989, and telephone conference with Larry Steward, Reno BLM office, April 14 and 18, 1989. *See* GAO Report at 43 and Appendix A hereto.

[99] *Id.*

[100] Act of July 23, 1955, Pub. L. 87-713, 76 Stat., 652, 30 U.S.C. § 611.

[101] GAO Report at 33.

[102] *Id.* at 35.

[103] *Supra* note 97. *See* Appendix B.

[104] GAO Report at 37.

[105] *Supra* note 43. *See* Appendix B.

[106] Telephone conference with Ed Ginouves, mining engineer, Grand Junction, Colorado, BLM Resources Area office, May 12, 1989.

[107] March 21, 1989 correspondence from Emil A. Romagnoli, ASARCO Incorporated, Government Affairs Department, New York, to Keith Knoblock, American Mining Congress.

[108] Telephone conference with Alan Rabinoff, Phoenix BLM office, April 11, 1989.

[109] Telephone conference with Tom Reitmeyer, Phoenix BLM office, April 11, 1989.

[110] Onanon/Superior/Haase & Whitson—Alan Rabinoff and Tom Reitmeyer, Phoenix BLM office, April 11 and 14, 1989. Commercial Minerals—Bruce Thomas, Denver Forest Service office, May 2, 1989.

APPENDIX A

TABLE II.1: Patent Sites Visited

<table>
<tr><th>Name</th><th>Nearest town/city</th><th>Date patented</th><th>Acres</th><th>Types of claim</th><th>Mineral</th><th>Status</th></tr>
<tr><td>Phelps Dodge Corp.</td><td>Prescott, AZ</td><td>11/82</td><td>7.0</td><td>Lode</td><td>Copper</td><td>Inactive</td></tr>
<tr><td colspan="7">These patents cover fractions within a large group of patented mining claims containing an orebody. The GAO representatives visiting this site were advised that major underground and some surface mining had occurred at this site intermittently from the 1890s until 1966. The GAO representatives also were advised that a major open pit mine will be developed sometime at this site but that no mining operations could begin until the completion of a land exchange for lands surrounding the ore body. The GAO representatives were advised that this land exchange had been proposed 17 years earlier but had been delayed by the studies and disputes arising from laws other than the Mining Law, and that this delay would not have occurred if the property could be patented under the Mining Law. The characterization of this site by GAO as merely "inactive" hardly does justice to the entirety of the circumstances surrounding the site.</td></tr>
<tr><td>Johnson & Johnson</td><td>Mesa, AZ</td><td>FY 1983</td><td>40.0</td><td>Placer</td><td>Sand & gravel</td><td>Active</td></tr>
<tr><td>Melluzzo & Nichols</td><td>Phoenix, AZ</td><td>10/87</td><td>18.8</td><td>Placer</td><td>Granite</td><td>Active</td></tr>
<tr><td>Phoenix Sand & Rock</td><td>Phoenix, AZ</td><td>9/85</td><td>15.0</td><td>Placer</td><td>Sand & gravel</td><td>Active</td></tr>
<tr><td>Melluzzo</td><td>Phoenix, AZ</td><td>11/70</td><td>61.3</td><td>Placer</td><td>Building stone</td><td>Inactive</td></tr>
<tr><td>Gornowich Sand & Gravel</td><td>Boulder City, NV</td><td>10/81</td><td>120.0</td><td>Placer</td><td>Sand</td><td>Inactive</td></tr>
<tr><td>Stocks Mill & Supply Co.</td><td>Las Vegas, NV</td><td>12/81</td><td>200.0</td><td>Placer</td><td>Sand & gravel</td><td>Active</td></tr>
<tr><td>Stocks Mill & Supply Co.</td><td>Las Vegas, NV</td><td>12/81</td><td>249.4</td><td>Placer</td><td>Sand & gravel</td><td>Active</td></tr>
<tr><td>Webster</td><td>Leadville, CO</td><td>3/86</td><td>140.0</td><td>Placer</td><td>Sand & gravel</td><td>Active</td></tr>
<tr><td colspan="7">These eight patents are all for claims located for common varieties of minerals prior to the passage of the Common Varieties Act of 1955. None of these claims could be located and patented under the present Mining Law. The Melluzzo claim listed as inactive has been a producer of building stone. The Gornowich claim listed as inactive had produced sand and gravel for more than 30 years.</td></tr>
<tr><td>M. Batesel</td><td>Carson City, NV</td><td>7/74</td><td>140.0</td><td>Placer</td><td>Cinder</td><td>Inactive</td></tr>
<tr><td colspan="7">Although listed as inactive, this claim currently is being produced.</td></tr>
<tr><td>H. Bunkowski</td><td>Carson City, NV</td><td>4/78</td><td>80.0</td><td>Placer</td><td>Gypsite</td><td>Inactive</td></tr>
<tr><td>H. Bunkowski</td><td>Carson City, NV</td><td>4/78</td><td>20.0</td><td>Placer</td><td>Gypsite</td><td>Inactive</td></tr>
<tr><td>H. Bunkowski</td><td>Carson City, NV</td><td>4/78</td><td>20.0</td><td>Placer</td><td>Gypsite</td><td>Inactive</td></tr>
<tr><td colspan="7">Although listed as inactive, over 39,000 tons of gypsite had been produced from these claims.</td></tr>
<tr><td>Yeager</td><td>Searchlight, NV</td><td>1/83</td><td>25.7</td><td>Lode & mill</td><td>Gold</td><td>Inactive</td></tr>
<tr><td colspan="7">Although listed as inactive, this lode claim and millsite began as a gold mining operation in 1936. The millsite was located in 1973 and the mill began running in 1975. Mining and milling were shut down after the owner's death.</td></tr>
<tr><td>Paul Brawer</td><td>Las Vegas, NV</td><td>9/83</td><td>310.0</td><td>Placer</td><td>Gypsum</td><td>Inactive</td></tr>
<tr><td>Pitkin Iron Corp.</td><td>Aspen, CO</td><td>3/83</td><td>15.0</td><td>Mill</td><td>None</td><td>Inactive</td></tr>
<tr><td colspan="7">Although listed as inactive, the facilities on these millsites consist of two ore crushers, 300 feet of conveyors, pan feeders to the crushers, transformers and three warehouses, shop and administrative buildings. The mill is presently inactive because the major customer (Colorado Foundry and Iron) shut down in 1982 and Pitkin currently is supplying other customers with stockpiled ore that already had been milled. This is a prime example of the incomplete information provided by GAO simply listing the status of the site as "inactive" and implying that the patent was obtained near a resort for nonmining purposes.</td></tr>
<tr><td>Hinton-Keystone Co.</td><td>Keystone, CO</td><td>12/83</td><td>160.0</td><td>Placer</td><td>Gold</td><td>Inactive</td></tr>
<tr><td colspan="7">Although listing this property as "inactive" with no further explanation, GAO was advised that Summit County, Colorado, had prohibited mining by zoning.</td></tr>
<tr><td>Paul Graham</td><td>Tuttletown, CA</td><td>8/85</td><td>34.0</td><td>Lode</td><td>Gold</td><td>Inactive</td></tr>
<tr><td>Paul & Judith Ramm</td><td>Jackson, CA</td><td>FY 1983</td><td>9.0</td><td>Lode</td><td>Gold</td><td>Active</td></tr>
<tr><td>J.D. Marquis</td><td>West Point, CA</td><td>11/82</td><td>12.3</td><td>Lode</td><td>Gold</td><td>Inactive</td></tr>
<tr><td colspan="7">BLM officials expressed their view of the lack of logic in GAO representatives visiting three small gold mines that are located within 30 miles of each other in the Mother Lode country while ignoring many other patented large operations in other parts of California. Each of the three patent sites has at one time been active.</td></tr>
</table>

APPENDIX B

TABLE II.2: Patent Application Sites Visited

Name	Nearest town/city	Acres	Type of claim	Mineral	Status
Onanon Inc	Bullhead, AZ	59.0	Lode	Gold, silver	Active
BLM is awaiting a mineral report from the BLM district office to determine whether these three lode claims are valid.					
Asarco Inc	Tucson, AZ	760.0	Mill	None	Inactive
Although production currently is suspended, the millsites are active and the patent applications are for an extension of ASARCO's Silver Bell mill tailings site. ASARCO is dropping 330 acres of the 760 acres of millsites for which patents will be applied, as these 330 acres have not been used yet and, therefore, do not quality as millsites. Silver Bell itself is a copper mine.					
Tognoni (MSC)	Flagstaff, AZ	314.0	Placer	Pumice	Active
This pumice stone claim was located on July 31, 1953. The percentage of common to uncommon variety on the claim is a current matter of dispute. On October 15, 1985, BLM issued a contest to this claim. On March 25, 1988, an Administrative Law Judge decided that Tognoni could select 22 acres out of the 314 acres requested in the 1978 application. An appeal to the IBLA by the Forest Service is pending. Tognoni has a contract with Levi Strauss Co., which uses this particular type of pumice stone to wash jeans, for the stonewashed brand of Levi products.					
Superior Companies	Camp Verde, AZ	331.0	Placer & mill	Gypsum	Inactive
The mineral examination on this Forest Service claim will begin in the summer of 1989.					
Haase & Whitson	Black Canyon, AZ	20.0	Placer	Gold	Inactive
The mineral examination of this claim has been done by BLM and is in the process of being evaluated.					
Anamax Mining Company	Green Valley, AZ	333.0	Lode	Copper	Inactive
These patent applications were withdrawn on December 1, 1988, when Anamax went out of business.					
Great Star Cement Corp.	Las Vegas, NV	1,920.0	Placer	Limestone	Inactive
BLM officials advised that documentation of this patent application has been referred to the U.S. Attorney's Office in Reno, Nevada, and that, therefore, it is inappropriate for them to discuss further.					
Edgar, et al.	Laughlin, NV	1,280.0	Placer	Precious metals	Inactive
This patent application was withdrawn on April 7, 1989, after a purchaser had retracted an offer to purchase iron sands from the claims. Although this property is listed as inactive, the GAO Report (page 20) criticized excavation and sampling activities on the claims.					
Commercial Minerals, Inc.	Buena Vista, CO	160.0	Placer	Limestone	Inactive
Although listed as inactive, limestone has been produced from this claim.					
Humbert Gamba	Glenwood Springs, CO	20.0	Placer	Gold	Inactive
BLM advised GAO representatives that this patent application could not be approved because the mineral discovery was based upon the use of a divining rod and insufficient other evidence of mineralization. This patent application was withdrawn by the applicant in July 1988, seven months before the GAO report was published.					
Cyrus Colburn	Breckenridge, CO	40.4	Placer & lode	Gold	Inactive
Cache Properties	Breckenridge, CO	19.9	Placer	Gold	Inactive
The Forest Service has determined that these claims are not qualified for patent and a hearing is scheduled on May 30, 1989, to confirm that determination.					

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Senator **Bumpers**. Thank you, Mr. Delcour.

Mr. McCloskey.

STATEMENT OF MICHAEL McCLOSKEY, CHAIRMAN, SIERRA CLUB

Mr. **McCloskey**. We at the Sierra Club have long been interested in reform of the Nation's mining laws, and we congratulate you, Senator Bumpers, on introducing what we view as an historically important bill to undertake that job. We support the general thrust of the bill, though we do believe that it can be strengthened in various ways.

Most public land laws contemplate a balancing of various competing interests before decisions are made to commit land to any one overriding use. This is the case in the mineral field with respect to oil, gas and coal which are all leased, but it is not the case with respect to hardrock minerals where decisions to commit land mining are made without any balancing of values. These decisions are made basically by the miner himself, not even the government.

Left out of consideration in most cases are environmental values which are often given rough treatment. What we get is often a sad legacy for the environment, streams degraded, valleys filled with toxic tailings, aquifers polluted and prime wildlife habitat destroyed, and wilderness compromised.

Most of this country's environmental laws are left with little force or meaning in the face of this antiquated preemptive law. It is time to change it. We believe that a thorough overhaul of the Mining Law is needed. Your bill would do that. Minor tinkering will not do the job.

Let me briefly suggest a number of improvements which we hope could be made to your bill.

With regard to prospecting, we do think a permit should be required. It would provide a mechanism to see whether the prospector's plans are consistent with the relevant rules and regulations and the chance of enforcing those rules.

With regard to lands that are locatable and open to mining, we agree with the list in your bill, but we think other areas should also be withdrawn, including units of the National Wild and Scenic River System, the National Trail System and obviously the National Park System and National Wildlife Refuge System.

We also think that exploration should not be allowed until a permit is issued, which includes appropriate conditions to protect other values and the environment. We do not think a property right should vest in the claimant prior to a permit being issued.

In your bill, Senator, only the right to impact surface resources is conditioned on approval by the relevant secretary of the exploration plan. We think the secretary should have the right to reject applications for an exploration permit if the proposed activity would be inconsistent with multiple use goals.

With regard to allowing a mine to be developed, we think that such a decision should turn on findings that the plan of development is consistent with land use plans for the area of the agency, that it represents the highest use of the land, that mineral development will be economically justified, and that all environmental laws including NEPA are complied with.

We also do not think that any perpetual property right ought to be conveyed when a miner is allowed to develop a mine. Like a license for a hydroelectric plant, it ought to be subject to periodic renewal.

We also believe that the annual labor requirements should be dropped entirely. These do little to develop a real mine and only disturb the environment. Intent should be demonstrated by annual payments alone.

We also think the bill should spell out more factors to be incorporated in regulations to protect the environment during operations, such as protection against blowing dust and operations in water courses.

Moreover, the reclamation provisions should address the long-term maintenance of tailing pond structures and burn stability as well as the removal of old machinery and equipment and the closure of shafts.

Finally, we support the idea of converting old claims into the new system but oppose letting the old system continue parallel with the new system. That will produce a legacy of confusion and conflict.

In conclusion, we think your bill represents an excellent start on achieving a reform in public land laws which is long overdue.

[The prepared statement of Mr. McCloskey follows:]

TESTIMONY OF MICHAEL McCLOSKEY

CHAIRMAN OF THE SIERRA CLUB

BEFORE THE

SENATE ENERGY SUBCOMMITTEE ON
MINERAL RESOURCES DEVELOPMENT AND PRODUCTION

REGARDING THE MINING LAW OF 1872

June 7, 1989

Mr. Chairman and Members of the Subcommittee,

I am Michael McCloskey, Chairman of the Sierra Club. The Sierra Club is a national volunteer-based conservation organization with close to 500,000 members and active chapters in every state. The Club has sought to protect this nation's public lands from mining abuses since its founding in 1892. We are pleased to appear before you today to discuss the 1872 Mining Law and potential changes to this antiquated legislation.

In the latter half of the 19th Century, the Congress adopted a number of laws to expedite and legalize the rapid disposal of the public domain. Minerals, timber, wetlands, water, farmland, range and other public resources were given away on a "first come, first served" basis. Today, most of these disposal laws have been replaced by laws that recognize the value of the public domain and encourage wise stewardship of resources while retaining the land base in public ownership. The one outstanding exception to this reform is the retention of the outmoded 1872 Mining Law.

This law was originally designed to clear up the questionable legal status of prospectors and miners who were technically trespassing on the public domain and stealing the public's mineral resources. What had existed prior to 1872 was enshrined into law by the new act: the public domain was officially thrown open to private exploitation and miners were granted an unconditional right to prospect and mine on federal lands. The act was a type of Homestead Act for miners and was designed to encourage development of the West and provide for the rapid transfer of the nation's mineral wealth and actual ownership of the land into private hands. The law remains today as not only a major giveaway of public resources, but also as an open door for unconditional development of minerals without significant consideration for balance with other competing land values or uses.

Over the last 115 years, bit by bit, the Congress has asserted some degree of control over the management of some minerals in some locations. The result is a hodgepodge legal framework that only a student of history can explain. Today, a private party must pay the government to extract sand or gravel from the public lands, but gold and silver are free. Coal is leased, and a royalty is required on each ton extracted, but a mineral like copper is free for the taking. Federal hardrock minerals under acquired federal lands in most Eastern states are leased, while those in public lands in the West are still subject to claim staking and patenting. There are strict, nonwaivable reclamation and bonding requirements for coal mining on federal lands, while hardrock mining regulation is discretionary and variable. Minerals that are regarded as strategic and vital to our national security are allowed to pass into private ownership where they may be "locked up" by a private mining company or exported to a foreign country. Elaborate plans are developed prior to considering putting a mineral like phosphate up for lease, including looking at the compatibility of development with other multiple use values; but hardrock mining is always considered to be the highest and best use of the land, and it routinely overrides all federal land use planning processes.

Clearly this is a situation crying out for reform. We welcome this subcommittee's consideration of this important subject, and we hope that it will lead to meaningful, comprehensive reform that will bring the last of our ancient disposal laws into the 20th Century.

For over 100 years critics have noted the deficiencies of the 1872 Mining Law and called for reform. Four themes have recurred in the studies over the last century: lack of adequate return to the Treasury, fraudulent acquisition of mineral lands, loss of public control of lands that are patented, and elevation of mining to the highest use of the land.

In 1880 the first Public Land Commission reported to President Hayes that it cost the government four times more to transfer title to the land than was received from the miner as a patenting fee. The 1903 Public Land Commission, led by Gifford Pinchot, uncovered widespread abuse of the law, including "perversion of the mining laws for purposes for which they were not intended."

More recently, a 1974 Government Accounting Office study ("Modernization of the 1872 Mining Law Needed") revealed startling abuses. An examination of 240 randomly selected claims determined that "239 were not being mined at the time of our visits, and there was no evidence that any mineral extraction had ever taken place on 237 claims." GAO estimated that "no minerals had ever been extracted in 197,000 of the estimated 200,000 claims" filed in 10 counties in the four Western states it studied. When it examined 93 randomly selected claims that had been patented, GAO found that only seven were being mined, while 66 were put to no apparent use. Twenty of the patented claims were being used for non-mining purposes including resorts, junkyards, a shopping center and even a house of prostitution. The GAO cited many of the same abuses that were disclosed in the 1903 commission report.

The GAO again documented the giveaway nature of the current mining law in a study released only two months ago ("The Mining Law of 1872 Needs Revision"). The GAO found 20 patents issued since 1970 for which the government received less than $4500 but which in 1988 were estimated to be worth between $13.8 million and $47.9 million. One 160-acre claim near the Keystone, Colorado, ski resort was patented in 1983 for $2.50 per acre and was offered in 1988 for nearly $11,000 an acre. As of October 1987, GAO reports that 265 patent applications are pending for more than 80,000 acres of public land. One parcel near Laughlin, Nevada, is valued at between $1.3 million and $32 million, yet the government will receive only $3200 if that land is patented under the mining law.

A far greater concern to the Sierra Club is the environmental abuse that has resulted from over a century of laissez-faire, hardrock minerals management on the public domain. Miners continue to bulldoze and blast in some of this country's most spectacular wild lands, including many national parks and wilderness areas, because this antiquated law continues to recognize mining as the highest and best use of the land. Streams are seriously degraded, prime wildlife habitat is destroyed, valleys are filled with tailings, aquifers are polluted or altered, and wilderness is invaded. The federal land managers say they have no ability to weigh the value of the proposed mining activities against the value of competing public multiple use values. Federal statutes such as the Federal Land Policy and Management Act(FLPMA), the National Forest Management Act, the National Park System Organic Act, the National Environmental Policy Act, the Wilderness Act and others lose much of their meaning when hardrock mining is placed above these laws by the 1872 Mining Law. FLPMA in fact mentions minerals as one of the multiple uses for which public lands should be managed in balance with other uses, yet the existing mining law elevates hardrock mining to a dominant use on most federal land. This sad state of affairs led Interior Secretary Stewart Udall to declare in 1969 that "after eight years in this office, I have come to the conclusion that the most important piece of unfinished business on the nation's resource agenda is the complete replacement of the Mining Law of 1872."

I would like to provide the subcommittee with a few examples from around the country of the types of abuses that are occurring because the 1872 Mining Law remains on the books.

GRAND CANYON NATIONAL PARK, ARIZONA

Most citizens and lawmakers presume that all energy fuels are leasable because they regularly hear about coal, oil, gas and geothermal leasing. However, uranium is a locatable mineral still subject to claim staking and patenting. As a result, federal land managers have their hands tied by uranium developers who want to exploit "their" claims -- even when development of their claims might jeopardize other public resource values. The sad case of uranium mining next to Grand Canyon National Park on Bureau of Land Management and Forest Service land is the direct result of the federal land managers having no discretionary authority.

Grand Canyon National Park is now surrounded by 45,000 mining claims on 1 million acres of land. Already there are five developed uranium mines near the canyon with several more planned in the near future. One exploratory drilling site is only 400 feet from the national park boundary. The superintendent of the national park has written to the Bureau of Land Management, which administers most of the adjacent lands where mining activities are proposed, complaining of damage to park resources from human activity associated with uranium exploration and development. The BLM has refused to look at the cumulative impact of all this regional uranium development activity because it claims to have no power under the 1872 Mining Law to control, and therefore assess, the nature and pace of mine development. The largest claim holder, Energy Fuels Nuclear, plans to open one or two new mines per year in the area between now and the year 2000, thus transforming this remote scenic country into a heavily industrialized zone.

EAST FORK OF THE JEMEZ RIVER, NEW MEXICO

Located at 8300 feet in the Jemez Mountains, a four mile-long, unnamed canyon with red-orange volcanic cliffs and the East Fork of the Jemez River flowing through it has long been a popular spot for fishermen, hikers and cross-country skiers because of its beauty and proximity to residents of northern New Mexico. Now the attributes of the area are threatened by a proposed 35-acre strip mine for pumice to be located on a ridge just a quarter-mile from the river, which has been sponsored for wild and scenic designation by Senator Bingaman and cosponsored by Senator Domenici in S. 940. Recreationists fear that dust and waste from the mine will mar the clear stream water and that noise of the mining operation will spoil the tranquility of the canyon. The Santa Fe National Forest Plan proposes to manage this area to protect its recreational and aesthetic values, but the Forest Service cannot deny permission for the mine at this location, although pumice is common throughout the region, because the operators appear to have a valid claim according to the 1872 Mining Law.

ARC DOME, NEVADA

Arc Dome is a spectacular 115,000-acre roadless area in Nevada, which has been recommended for wilderness by the Forest Service, was included in wilderness legislation which passed the House twice and now is in both House and Senate wilderness bills pending before Congress. In 1987, the Forest Service approved the construction of a road to an unpatented mining claim up South Twin River Canyon, an action currently under administrative appeal. This canyon has a class 1 fishing stream and the most popular trail on the east side of the proposed wilderness. The claimholder is looking for gold, even though previous prospecting and exploration, including an assay by a federal geologist, indicates there is no marketable deposit. Past bulldozer work in the lower canyon by miners has already caused serious damage to the area.

SMITH RIVER, CALIFORNIA

At Gasquet Mountain, overlooking the wild and scenic Smith River in northwestern California, the 1872 Mining Law is in conflict with the Endangered Species Act, the Wild and Scenic Rivers Act, the Resources Planning Act and the National Forest Management Act. The Forest Service has taken the position that the California Nickel Corporation has an unquestionable right to exploit the mineral resource here despite the substantial adverse environmental impacts that are ~~occurring~~ on the surrounding public resource values. In the Six Rivers National Forest Plan the agency has refused to examine the impacts of the mining on other forest values, hiding behind the primacy of the 1872 Mining Law.

WRANGELL-ST. ELIAS NATIONAL PARK WILDERNESS, ALASKA

National Park System units are withdrawn from mineral entry, subject to valid existing rights. One would expect the National Park Service to determine whether there is a valid existing right on each unpatented claim before approving operations on it, since in the absence of a valid existing right there is no right to mine whatsoever. In fact, the Park Service does just this in the Lower 48 parks. But in Alaska, as a matter of agency policy and practice, validity determinations are not made before mining operations are approved; rather, validity is assumed, and access is guaranteed to private property, which includes valid claims under the 1872 Mining Law. The Silver Star/Pandora Mine is located within a portion of Wrangell-St. Elias that was designated wilderness. Operations were approved in the period 1979-1985, including a major road and "several large cuts in the mountainside." The Park Service did not get around to examining validity until 1986 and concluded at that time that "a proper economic analysis would find (all) claims invalid."

DENALI NATIONAL PARK AND PRESERVE, ALASKA

In Denali, where many mining operations are concentrated, mines have discharged anywhere from 300 to 36,000 pounds of sediment per hour into the park's streams. Miners have neglected millions of dollars worth of mandatory reclamation, and they have etched nearly 100 miles of unlawful access routes across the tundra. The U.S. District Court in Alaska found that such mines in parks were "causing extensive environmental damage to the parks. " Waste water discharges from park mining operations were found by the court to "grossly exceeded water quality standards at all operations tested." The court also found that "mining has major adverse effects on fish habitat and water quality, ... mining will cause a decline in animal populations, ...and it would degrade the mining area's scenic values."

PICEANCE BASIN OIL SHALE CLAIMS, COLORADO

The recent uproar over the Tosco settlement on oil shale claims has highlighted some of the worst abuses that can occur under the 1872 Mining Law. The Reagan Administration's settlement irrevocably transferred for $2.50 per acre over 82,000 acres of public lands in Colorado to Exxon, Union Oil, Tosco and other energy corporations. This area included a proposed research natural area rated by the Nature Conservancy as the single most important site in the entire Piceance Basin for protection of rare plant species; the lost federal royalty revenues from the oil shale reserves are estimated to be $34 billion. While we applaud Congressional efforts designed to specifically block and amend this unwarranted and ill-advised disposal of our national heritage, we feel this latest oil shale episode draws attention to the need to completely rewrite the underlying law, which is the root of the problem. Currently there are 250,000 acres of oil shale claims in Wyoming, Colorado and Utah, including huge areas of prime big game habitat, which remain subject to disposal under the 1872 Mining Law.

A COMPLETE REWRITE OF THE MINING LAW IS NECESSARY

It is the Sierra Club's position that minor amendments to this troublesome law will not solve the problems that it poses, and to adopt only partial changes while allowing other key elements of the current system to continue would be a mistake and an important opportunity lost. What is needed is a complete overhaul. The problems inherent in the present system run so deep that only a new system will bring about lasting and meaningful reform. If only a few features of the existing law are fixed, the inevitable task of full reform will only be postponed to a future Congress while important public land values continue to be sacrificed. The problems have been apparent for over 100 years. The solutions to these problems are also readily apparent.

What follows is a brief overview of the major areas needed in any reform measure and our initial comments on draft legislation made available recently to us.

PROSPECTING

Prospecting, as long as it does not involve road building and is not done with heavy equipment and explosives, need not involve significant environmental impacts, and therefore does not necessarily need to be heavily regulated. However, it only makes sense to prevent prospecting in environmentally sensitive areas, withdrawn lands and conservation units where mineral exploration and mining are not appropriate.

The draft bill puts off-limits withdrawn lands, BLM and Congressionally designated wilderness study areas, and lands recommended by the land managing agency for wilderness or further wilderness study. Added to this list should be both Congressionally designated or administratively identified wild and scenic river tudy segments, units of the national wildlife refuge system, ational trails system and national park system, and other areas hich have been identified administratively for protection of heir surface values. Also, it should be clarified that these reas are to be reopened to prospecting only after Congress has cted to do so.

XPLORATION PERMITS

We feel exploration should not be allowed without a permit. ach permit should contain conditions to guarantee protection of he environment and should be limited in term and acreage.

The draft bill goes a step beyond just guaranteeing a preferred position o the prospector to actually granting a self-initiated right to explore and isturb the land surface. Before surface disturbing activities are allowed to ccur, compliance with the National Environmental Policy Act should be achieved, nd the option retained by the land managing agency to deny or condition he proposed activity when it would conflict with multiple use goals for the rea. We urge that the deadline for submission of a mineral patent be reduced rom 10 to 5 years to discourage speculation.

AND AND MINERAL TENURE

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No party should be allowed to develop or produce minerals on the public land until the Secretary of the surface management agency determines that the proposed operation is compatible with the land use plan for the area and that development of the minerals will be economically justified and consistent with multiple use objectives. This is the most important provision we recommend today.

There has been much discussion in the wake of the Tosco oil shale settlement that there should cease to be patenting of the surface on valid mining claims. We agree, but in our mind it is only partial and very unsatisfactory reform to stop patenting while retaining the archaic claim-staking system. With conversion of the current hardrock minerals program to a discretionary system, there is no need to consider patenting reform in isolation.

We oppose creating split estate ownerships and inholdings by allowing the surface or the subsurface rights, or both, to be transfe to private ownership at the option of the mining interest as currently allowed. This mixed ownership pattern creates administrative nightmares and often great public expense when the need arises to buy back these inholdings in the future. Granting conditional permission to use the surface or subsurface for a set period of years with options to renew is the best way to go.

One of the reasons we are so uncompromising in our support

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f a discretionary system is that we are anxious to reassert the ublic interest into the mineral management decisions on our ublic lands. As long as a property right is created by self-nitiation, there is no opportunity to weigh mineral development gainst other competing multiple use values. Only a process that llows discretionary approval/disapproval, will fix this fatal flaw.

The draft bill takes an important step towards reasserting ublic control over public resources, but still stops short of hat needs to be done. The Secretary would still be obligated to pprove mining in virtually all cases. Controls on mining in a iven area would have to be anticipated and adopted into the gencies land use plans, which may have been approved many years n advance of any mining proposals. The draft bill should be mended to provide for Secretarial discretion to disapprove or ondition a mining project at the point of granting the rights to the minerals, and the Secretary should only allow mining if it is determined that it will be consistent with multiple use goals for the area, is found to be the highest and best use of the land, and can be demonstrated by the proponents to be enconomically viable at that time. It is crucial that at this point full compliance with the National Environmental Policy Act take place so that a reasonable decision can be made with all the facts at hand.

LAND USE PLANNING

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Current land use plans will require significant revisions if they are to be useful tools in guiding hardrock mineral development on public land. Most land use plans being produced by the federal agencies today give only cursory attention to hardrock mining because they presume that the 1872 Mining Law has placed all decision making authority out of their hands. They assume all claims are valid until proven otherwise, and they presume that whenever a miner wants to develop a claim that all other resource users will have to step aside and all environmental costs will have to be absorbed. For example, the Environmental Impact Statement for the Kaibab National Forest states that "the capability of the Forest Service to influence operations during the mine development and production phases is limited to review of mining plans of operation to ensure reasonable protection of surface resources."

The draft bill would make mining subject to the stipulations of the adopted land use plans, which is a major improvement over the current condition. However, many land use plans are already adopted and some provision for amending existing plans to comply with the proposed mining reforms needs to be included in legislation. It is also important to note that the BLM and Forest Service typically create broad, programmatic land use plans and defer detailed stipulations until after a site specific project is proposed and reviewed. The land managers and the public would be placed at a great disadvantage if the Secretary did not retain discretion to disapprove or condition a mining plan at the point that the commitment to develop was made after a site specific environmental review.

SMALL MINERS

Mining law reform need not drive the small miner out of business so that only large corporations can compete, and this is not our intent. Provisions could be made in regulations for small miners to file abbreviated exploration and mining plans without relaxing environmental protection measures. An individual with a bulldozer in a stream can do more damage than a large corporation with a major mine in environmental compliance.

One major problem that has surfaced in Alaska and elsewhere is the significant damage allowed under the 5-acre exemption in the mining regulations. The total acreage disturbed is not a good measure of the damage that can be done. The government should require that all mining operations, other than those that result in only negligible surface disturbance, should be reviewed to determine that they will not cause unnecessary or undue degradation of the lands.

The draft bill is a good start in that it creates no legal loopholes for damaging activities to occur simply because they slip under an arbitrary threshold of size.

RECLAMATION AND BONDING

The Forest Service and the BLM, after a century of giving the miners a free hand to scar and abandon the public lands, have finally adopted minimal discretionary reclamation and bonding regulations. While we support this timid first step, we feel these important provisions should be given the force and permanence of law and beefed up to insure that any disturbed land is returned to its original capabilities. Bonds should be held until the reclamation is clearly successful. Where perpetual care and maintenance is required (as with massive tailing pond structures), the bond should be used to endow a perpetual maintenance fund.

An example of what is to come in some locations is the proposed Barr open pit gold mine in northern Nevada, where one billion tons of material w be removed to create a mine 1300 feet deep. It is expected that this hole will eventually fill with water to create the largest man-made lake in the state, but the water may be so polluted by mine toxics as to be unusable by man or wildlife.

The draft bill creates a reclamation and bonding program that is long overdue. We suggest, in addition, the creation of an abandoned mine land reclamation fund for historic problems. This

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program could be funded by hardrock mineral royalties. The draft bill should require that bonds be held until reclamation itself is known to be successful, not just until the reclamation plan has been complied with.

ROYALTIES

Many commercial activities on public land are unduly subsidized, but none so much as hardrock mining under the current law where no payments are collected at all by the federal government in exchange for the permanent loss of the public mineral wealth. Reform legislation should correct this by establishing a reasonable level of royalty payments to the government based on how much mineral value is extracted.

The draft bill proposes a royalty payment of 8% of mineral value; we support raising that to 12.5%.

DILIGENT DEVELOPMENT / ANNUAL ASSESSMENT WORK

The existing $100 per year annual assessment test of diligence is clearly useless and designed for a bygone day when pick axes and burros were the main mode of operation. The solution is not to raise the annual assessment amount because this may only invite claim holders or leasees to run bulldozers all over, causing great environmental damage just to meet a targeted level of expenditure. Limits on the acreage one party can control, deadlines for commencing operations under an approved plan, and revocation of unworked leases after a reasonable period of time are all valuable tools to make sure that the nation's mineral wealth is not locked up by speculators.

The draft bill provides deadlines designed to discourage speculation, although we recommend requiring production within 10 years rather than 15. Also, production should generally be continual except for very limited exceptions; the draft bill seems to allow the mine operator to commence production right away to hold onto the patent, but then allows operations to be suspended indefinitely. We remain concerned that spending a certain amount to develop exploration claims and mineral patents will encourage unnecessary surface disturbing activity simply to keep the claim or patent valid. We suggest dropping the requirement for labor or other activity and simply stick with the payments in lieu of labor.

STATE PREEMPTION

We firmly believe that where states or Indian tribes have stricter environmental regulation of mining than the federal law, the more protective standards should govern.

The draft bill does not address this and should be amended to require stronger environmental protection where state or tribal regulation would provide that.

INVALIDATION OF OUTSTANDING CLAIMS

Upon the date of introduction of reform legislation, no new claims should be located or patents issued. Valid claims may be converted to the conditional mineral rights under the new mining system. Those who do not seek conversion of their claims to the new system within a reasonable period of time should have their claims extinguished. Federal land managers should seek to extinguish old claims in conservation system units on a priority basis. Those with claims inside conservation system units, who cannot prove they have a valid existing right according to the standard marketability test, should have their conversion applications denied, and the lands covered by the invalid claims should be permanently withdrawn from mineral entry.

The draft bill allows for an aggressive program to transfer current mineral rights into the new limited patent system, and this is essential to avoid protracted confusion and uncertainty in future land management. However, the option to retain the old claim system still exists and this should be extinguished.

STATEGIC MINERALS ACCESS

In 1981 legislation was introduced with the stated goal of guaranteeing this country's continued access to certain scarce minerals, although in fact the proposals were a thinly veiled attempt to raid the public lands and override environmental constraints. Review of the 1872 Mining Law may get into an exploration of these same issues. Environmental groups made a number of alternative recommendations on this issue in a 1981 report "Minerals and the Public Lands". The recommendations contained in the report are still worthy of adoption today. They include:

1) Enhance trade relations and stockpile preparedness.
2) Develop of methods for encouraging and requiring recovery and recycling of strategic minerals.
3) Development of new techniques to improve the yield from mining and processing operations.
4) Make a national priority of comprehensive and continuing studies to find substitutable minerals.
5) Initiate a careful assessment of our domestic processing capacity.
6) Publicly disclose exploratory information to assist in the resource planning process.

Thank you for this opportunity to testify. If you have any additional questions, please feel free to call on us. We look forward to working with the Congress to adopt total and lasting reform of the 1872 Mining Law.

Senator **Bumpers**. Mr. McCloskey, thank you very much.
Mr. Snow.

STATEMENT OF GEOFFREY G. SNOW, MINING COMMITTEE CHAIRMAN, MINERALS EXPLORATION COALITION, ACCOMPANIED BY BRAD MILLS, CHAIRMAN

Mr. **Snow**. With me today is Brad Mills. He is the Chairman of Minerals Exploration Coalition. I am the Mining Committee Chairman.

I am a hardrock exploration geologist. I have been one for 28 years. I worked with five companies. I am now in a partnership with my wife, also an exploration geologist. We work out of our basement.

I am here on behalf of the Minerals Exploration Coalition. They represent individuals and companies involved in exploration, and we are eminently qualified to talk about the Mining Law.

It seems to me that enabling legislation affecting an entire industry must take into account the realities of that industry. You asked a question a few minutes ago of Mr. Ary about what the difference was between oil and gas in this industry. I will try to answer that question.

In order to survive in the long term, a mining company must have a large long-life profitable mine. That is not the end of it there. By the time that mine is mined out, that company must replace that reserve. That is the impetus for exploration.

What kind of mine is most likely to be found? If you will look on page 5 of my testimony, there is a chart that is illustrative of the types of deposit most likely to be found. The odds favor finding a small deposit. The very best of the small deposits might pay for cash flow. That is about the best they do. The big ones are the main objective.

I ran a fair size exploration company in the United States for 13 years. It was the U.S. exploration arm of Canada's largest natural resource company. Over the 13 years, we spent $103 million in exploration. We made eight discoveries. That figures to be a discovery cost of $13 million per deposit. That is not bad. That is about a third of the industry average, which is estimated to be about $40 million per deposit.

Before you rub your hands and start spending the revenues from those deposits, let me tell you a little about them. In 1973 we found a base metal deposit in the woodlot of a farmer's lot in Wisconsin. That deposit contained about 2 million tons of zinc ore. That same summer our competition found just down the road a 50 million ton deposit. That was the one we were looking for.

The State of Wisconsin instituted a royalty to cash in on that big deposit. The royalty was so high, the State of Wisconsin never got a penny. By the time we convinced Wisconsin the royalty was too high and they lowered it, the zinc price fell out of bed. The combination of high holding cost and unlimited permitted delays in Wisconsin precluded holding the land, so the $13 million discovery cost for that deposit was down the tubes.

In 1974 we managed a joint venture in Alaska and found a high grade silver/gold/zinc deposit on forest land in Alaska. In 1978 Mr.

Carter and Mr. Andrus declared that area to be national monument and wilderness. How is that for regulatory uncertainty?

Delays wore the company down. By 1986, 12 years after the discovery, the company lost heart and sold their interest in the deposit. The $13 million average cost of the discovery was down the drain.

In 1975, right in the middle of a mostly mined out district, we found the free world's largest primary cobalt deposit; the average cost of discovery, $13 million. Right after we discovered it, the price of cobalt rose from $6 a pound to over $25 a pound. Before it fell back down to $6 where it now languishes, the company spent an additional $35 million. Great deposit, lousy market.

So what happens? Along comes Superfund and slaps us with a $25 million lawsuit, and we have a deskful of letters from the State of Idaho saying what a good job we did cleaning up the messes that were left from the days of the Korean War and before.

Occurrences like this add uncertainty and risk. Aside from that, it is a world class cobalt deposit. With a $20 price, it could support a lot of discoveries that do not pan out. It is not now economic. It would not now be patentable under your proposed legislation. 10 years has passed.

We found and mined a small gold deposit in Northern California; the average cost of discovery, $13 million. It was put into production for $40 million. The gold price fell. That deposit never paid its cost of operation. It never paid its discovery cost, and it never paid the capital back; $55 million gone.

We found two gold deposits in Nevada. One is one of those 118 on the left of this chart here. Good grade, lousy metallurgy. If it were bigger, we could put it into production. It is not. It would take a metallurgical breakthrough or a higher gold price to make that economic.

There is just no such thing as a typical deposit. Only the big ones are really truly profitable.

The Canadian company I worked for made money in the 1970s and 1980s, but between 1982 and 1987 they lost $460 million. In 1985, the year Noranda lost $240 million, I had to fire 55 of my colleagues. The next year they consolidated the organization with a Canadian group; 18 top hands lost their jobs. I was one.

Ours was not the only company to fire the exploration troops. The 2,000 exploration people that were on the roles of the organizations in 1982 have been reduced to 600 today. Most companies do not have enough troops to do the generative exploration work, but that is not so bad. Independent exploration scientists like my wife and I are hoping to fill that void. It is the prospect of a piece of that royalty and hopefully for one of those deposits on the right-hand end of that chart that motivates us.

For the type of gold deposit we are seeking, a 40-claim block would be enough to cover the conceptual target. We can afford to stake and do inexpensive exploration. We probably should have six to 10 such prospects in order to have any chance of beating the odds. With the help of investors, we can do that.

But, Senator Bumpers, your bill will drive us out of business. It will perhaps drive us overseas. We are too old to go to law school. [Laughter.]

If you want to make a bill that will help this industry, that will take into account the realities that I have related to you, we will be glad to help you. I suggest you jack up the staple and start over.

[The prepared statement of Mr. Snow follows:]

MEC

MINERALS
EXPLORATION
COALITION

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Statement of

Geoffrey G. Snow, Ph.D.
Barranca Resources

for the

Minerals Exploration Coalition

on

Legislation providing for disposition of hardrock minerals on federal lands

before the

Subcommittee on Mineral Resources Development and Production

of the

Committee on Energy and Natural Resources

United States Senate

7 June 1989

Mr. Chairman and Members of the Subcommittee:

The Minerals Exploration Coalition (MEC) represents companies and individuals engaged in the exploration for hardrock minerals. The membership of MEC includes major mining companies, small mining companies, companies that drill for and analyze exploration samples, mineral exploration consultants and individual exploration geologists. MEC is uniquely qualified to testify on mining law.

Would that the title and purpose of the legislation proposed by Senator Bumpers were the same as the title of this subcommittee, to wit: the Mineral Resources Development and Production Act. At a minimum, the purpose of any mining law should be to foster and encourage rather than to throttle and dissipate.

The Bumpers bill raises all public lands to standards that exceed those imposed on wilderness lands by the 1964 Wilderness Act. The higher standards include royalty, increased work requirements, and exceedingly short time limits, as well as the more stringent standards imposed by all the environmental protection and land management laws and regulations implemented since 1964.

We have been asked to address provisions of the proposed bill. Put in a nutshell, the provisions of this bill would succeed in doing what the horrific depression in world commodity prices was unable to do between 1982 and 1987: kill the domestic metals and minerals industry.

We believe that it is possible to write a bill that would win support from the minerals exploration community. This bill is far from that document. Rather than picking at the proposal, we feel it is more productive to discuss principles from the informed point of view of those who explore.

GENERAL PRINCIPLES

AMEND, DON'T TRASH: If the General Mining Law is trashed, the development of regulations and litigation to implement a new law will result in destructive and costly delays. The government must provide the legal framework in which exploration can take place. That framework is already in place.[1] Do not start all over with new legislation. We suggest, rather, the 1872 law be amended. In so doing, the law, which all understand and which has been fully litigated, will permit continued exploration so necessary to the industry's survival. If depleted ores are not constantly replaced in a timely manner, the industry cannot survive. The industry and the government both would benefit from continuity of practice. The industry needs the stability and the smooth transition this would ensure.

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[1] The General Mining Law is buttressed by more than 117 years of litigation and mining experience. This legacy is too valuable to waste!

MINING LAW MUST BE A TENURE LAW: The books are filled with laws that deal with environmental care and reclamation. If these must be amended, amend them. Provide cross reference if need be. Do not confuse the mining law with them.

FUNDAMENTALS: The nation's mineral security is at stake. A competitive domestic mining industry is necessary to provide for the nation's security and prosperity. Any mining law must encourage the exploration for and mining of hardrock minerals on the public lands. The mining law must permit self-initiation and provide for access and tenure.

- **SELF-INITIATION:** We are gratified that thoughtful parties have been converted to the principle that self-initiation is necessary to encourage adequate levels of exploration.

- **ACCESS:** Congressman Craig summed up this problem in the 1987 House hearings on mining law, "So really the problem you're all dealing with is access."[2] Indeed, discussions of the mining law are inextricably bound to issues of access.

In the past, the General Mining Law has been successful in enabling the mining industry to provide for the nation's mineral requirements. Now, with so much land withdrawn, the opportunity to find deposits that are competitive with those of foreign countries is much reduced. For example, ores from high-grade and polymetallic deposits overseas have displaced much domestic base metal production. This nation must produce from domestic deposits of similar quality to maintain its economic health and security. Production from deposits of this type is becoming more difficult, as much of the land in the United States likely to host these deposits has been withdrawn from mineral entry. Discoveries of strategic or nonstrategic minerals cannot be made without access to land. Without discoveries, there can be no mines. Without mines, the nation's mineral needs cannot be met!

- **TENURE:** A claimant must be entitled to tenure sufficient for the opportunity to find, develop, and produce from an economic deposit, so long as the claimant exercises due diligence.

Diligence must be retained in a form that requires money to be spent for the purpose of discovering mineral deposits. It is in the best interest of the country that new mineral deposits be located as expeditiously as possible. Expenditures that are normally made in the pursuit of discovery should be deemed acceptable for annual labor. It is imperative that annual labor be invasive (e.g. drilling, trenching, mining, etc.) for at least two years of every five. This invasive work is necessary to provide for the actual discovery of mineral deposits. MEC opposes payments in lieu of labor. In-lieu payments contribute nothing toward the discovery of minerals, and lends itself to abuse by non-miners.

Discovery is the key element which prevents the mining law from being abused for other purposes. Assuming compliance with all other laws and regulations that relate to exploration, the accomplishment of discovery defines a valid claim and provides the mechanism by which all others may be declared invalid. It should be the milepost at which tenure to a mining claim is guaranteed and patent becomes achievable. Discovery must be defined by a standard, similar to "Prudent Man" so that subeconomic deposits may be held.

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[2] Oversight hearings on the Mining Law of 1872, 1987, Subcomm. on Mining and Natural Resources of the House Comm. on Interior and Insular Affrirs, 100th Congress, 1 Sess., p. 412.

Term of tenure must be at the discretion of the risk-taker. It should be limited only by the willingness to be diligent. An increasing schedule of annual labor requirements up to some ceiling would ensure diligence. The annual labor schedule must be founded in the reality of the exploration budgets and land needed for systematic exploration. The annual labor requirements of the proposed legislation are ridiculous and have no foundation in reality. It should be noted that assessment rates in Mexico are $0.25 per acre and in British Columbia range from $1.60 to $3.20 per acre. Both of these well-mineralized areas provide competition for the United States for discovery and production.

PATENT: The right to mine a discovery is essential to any system in which high-cost and high-risk exploration plays a role. Without that right there is no incentive to explore. If, as Senator Bumpers says ". . . the major reason for these withdrawals [millions of acres which have been withdrawn from location and patent] is the mining law's patenting provision,"[3] the industry would yield the right to patent the surface in exchange for access to those millions of acres.

We understand that private purchase of public land is a sensitive and, indeed, a heinous issue now. Surely patent can be modified to satisfy the moderates on both sides of the issue.

Patent to the minerals without term is essential. In many mining areas extensions of existing deposits or new deposits have been found years after the original deposit had been mined out. New exploration concepts and new exploration and recovery technology make this possible. Rich, but deep ore was discovered in 1987 beneath the depleted surface deposit at Carlin (itself discovered in 1963). The mining literature abounds with anecdotes about areas explored for decades before an economic deposit was outlined, and about economic discoveries delayed for up to 15 to 40 years by governmental impediments.

The granting of a patent to the minerals must convey with it the right to use such surface as is required to develop and mine the deposit. We suggest that the study submitted in support of patent application should identify surface required for mine operation. The land manager must incorporate those lands into the land use plan where they would be given priority for mine development.

Discovery should remain the qualification for patent. An adaptation of the "Prudent Man" test would be appropriate. The requirement for patent should be liberalized to focus on the feasibility of mining at the present or sometime in the future.

ROYALTY

Philosophically a royalty has popular appeal. But is a royalty on hard minerals good public policy? The answer depends on the nature and objective of the royalty. To establish good public policy these aspects must be analyzed:

- Nature of the royalty base.
- Cost to society of the royalty.
- Benefits to society (costs of collection versus amount collected)
- How royalty on production from public land will change the conduct of business.

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[3] Bumpers, D., 1988, Reform of the 1872 Mining Law: Congressional Record - Senate, p. S 16777.

It is argued that companies pay royalties to private land owners. This is true. The explorer evaluates the geology of a site and judges what type and quality of deposit is most likely to be found. With the full knowledge of the nature of the royalty base and of the risks involved, a site-specific royalty is negotiated. If a marginal deposit is found, the explorer may renegotiate the royalty to accommodate the deposit realities. This is not the case if the government-as-landlord were to impose a uniform royalty.

Land owned by railroad and timber companies is seldom explored as the "standard" royalties are too high to warrant the exploration risk.

NATURE OF THE ROYALTY BASE: Three important risks distinguish hard mineral exploration. They are inherent to the nature of mineral deposits. They are:

1) the high risk associated with the discovery of economic mineral deposits,
2) the great variability of the return among economic deposits, and
3) the sensitivity of exploration economics to metal price uncertainty.

These risks are basic considerations which must be understood when formulating government royalty policy.

- **DISCOVERY RISK:** Most deposits do not pay for the cost of their discovery. It is the nature of mineral deposits that there are many, many small deposits and only rare large ones (see Figures 1 & 2). Sixty percent of volcanogenic base metal deposits[4] contain less than 2 million tons of ore; 91% are smaller than 12 million tons. Only 5% of all the deposits are larger than 50 million tons. On average, the deposits most likely to be found, those smaller than 4 million tons, may never pay back their capital.

The average costs of finding an economic deposit (known as discovery cost) are estimated at between $35 and $50 million dollars. This means that deposits in the 5 to 10 million ton range, although able to repay capital, are unable to pay for the cost of their discovery. It is a fact in the mining business that a company, if it wishes to stay in business, must find a large and profitable deposit once in 25 to 50 years to pay for the discovery of those smaller deposits it mined for the cash flow simply to stay in business.

A royalty on roughly 90% of the deposits would be punitive!

- **VARIABILITY OF RETURN RISK:** Mineral resource royalty policy ordinarily is formulated by evaluating investment incentive and royalty payments resulting from the imposition of various royalty burdens on a "typical" deposit. This inevitably results in the recommendation of a uniform royalty that provides an "equitable" sharing of returns based upon the assumed typical deposit conditions.

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[4] Boldy, J., 1977, (Un)certain exploration facts from figures: Canadian Inst. Mining Metall. Bull., v. 70, p. 86-95.

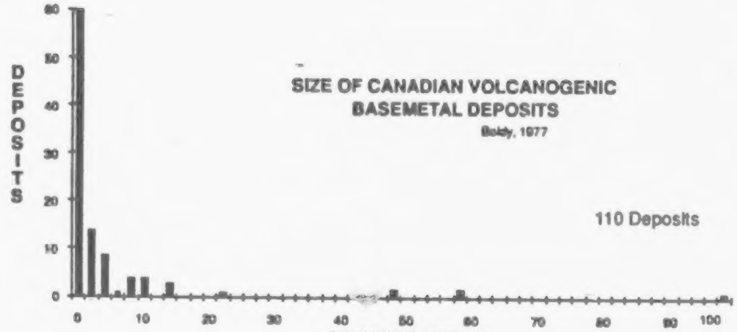

Figure 1

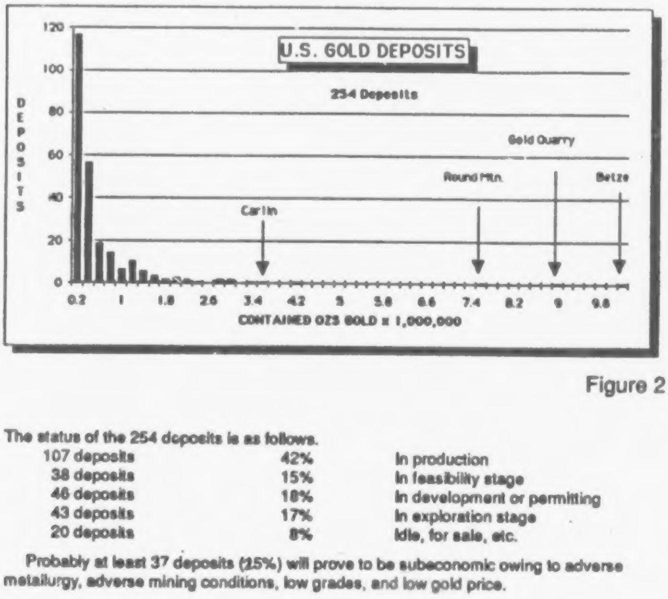

Figure 2

The status of the 254 deposits is as follows.

107 deposits	42%	In production
38 deposits	15%	In feasibility stage
46 deposits	18%	In development or permitting
43 deposits	17%	In exploration stage
20 deposits	8%	Idle, for sale, etc.

Probably at least 37 deposits (15%) will prove to be subeconomic owing to adverse metallurgy, adverse mining conditions, low grades, and low gold price.

Policy based on such an assumption ignores one of the fundamental characteristics of mineral endowment: the variability of returns among economic deposits. Put simply, this means that roughly 75% of all deposits are less profitable than the median deposit. A uniform system of royalty, promoted by this type of analysis, will inevitably tax the marginal economic deposits to death. A uniform royalty rate is bad public policy because there is no such thing as a typical deposit (see Figures. 1 & 2).

- **PRICE RISK:** The uncertainties associated with metal prices owe to the fact that prices are bound to change unexpectedly. Metal prices have always fluctuated dramatically. Under these conditions, a uniform royalty system based on a perception of some single commodity price within a range of prices will be inappropriate and irrational. Once again, flexibility is required in the royalty system if these unpredictable changes are to be accommodated. Failure to accommodate metal price risk when formulating royalty policy will result in waste of the country's mineral endowment.

If these characteristics of the mining industry are considered, it can be seen that flexibility, not uniformity, is required in a royalty system if the full potential value of the mineral endowment is to be realized for society.

COST TO SOCIETY OF THE ROYALTY

- **LOSS OF PRODUCTIVE POTENTIAL:** To encourage exploration investment, the best policy would maintain a positive investment incentive for all potentially economic deposits. This would encourage companies to create wealth for the country. It is conceivable that some part of this wealth generated by more profitable discoveries could be captured by a royalty. But the royalty must not take such a high proportion of the revenue that investment and operating efficiency would be impaired. In the long term, royalty revenues will be decreased if otherwise economic discoveries are not developed, or if investment incentive is not maintained.

Maximizing potential value should be the objective of resource policy. Data[5] from a study of the Canadian base metal sector[6] indicate that the number of deposits that could be economic were reduced from 87 to 81 when taxed at the federal and provincial tax rates of 1980. Consequently, the actual value of minerals produced realized by Canadian society was only 93% of the potential value.

Government policies should encourage realization of the full productive potential of mineral resources, especially those on public land.

- **COMPETITIVENESS:** More is at risk than mere loss of production from a single deposit that is shut down or not discovered because of higher costs incurred by royalty.

The reality and perception of the added cost will result in less exploration and fewer discoveries. This will lead to the development of fewer economic deposits. Fewer discoveries and less mine development will lead to higher-cost domestic production. Higher-cost domestic production will be supplanted by lower-cost foreign production. This will cause greater reliance on imported minerals.

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[5] Snow, G.G. & Mackenzie, B.W., 1981, The environment of exploration: economic, organizational, and social constraints: Economic Geology, 75th Anniversary volume, p. 893.

[6] Data of this type are not available for the United States.

Policy makers must realize it does not stop there. Metal-producing countries are sophisticated. More and more, they are insisting on adding greater value before export. Accordingly, the loss of competitiveness is compounded: loss of U.S. metal production means fewer mining jobs, less smelting and refining business and fewer jobs, and finally, less manufacturing business and fewer manufacturing jobs. The cumulative effect means greater reliance on imports. Resource policy must consider the costs to society of the trade imbalance.

- **MINERAL ENDOWMENT CONSIDERATIONS:** Base metal deposits of the United States are inherently less competitive in world markets for geologic reasons. The most important reason is that by-product credits and high-grade ores characterize many overseas deposits.[7] These are phenomena of the mineral endowment of the various countries. The presence of by-product credits in the copper ores of Australia, Canada, and Papua-New Guinea accounts for their prominence in world copper markets. By-product credits in the ores from these countries represent 70 to 180% of their production costs. High-grade ores permit Chile and Peru to dominate U.S. copper imports. U.S. base metal deposits inherently do not possess the attributes of high-grade and by-product value. Accordingly, they are less competitive. Competitive deposits remain to be found on the lands of the United States, but access is denied to most places where these types of deposits are to be found.

In addition to the geologic inequities, metals from the developing world are produced at lower cost that is attributed to lower costs of labor, of environmental protection, of worker safety, of capital, as well as state subsidies and protection of markets.

Resource policy must consider the costs to society of a royalty imposed by the government that will artificially exacerbate a natural competitive disadvantage already borne by U.S. mineral production.

BENEFITS TO SOCIETY (COSTS OF COLLECTION VERSUS AMOUNT COLLECTED)

Owing to the tremendous diversity of commodities and mineral deposits, any type of flexible royalty would require a bureaucracy of such complexity and size that its costs would exceed the potential revenue from royalties. If royalties are large enough to be significant in the context of our government, they will add such a large element of risk and cost that they will drive the industry off of public lands. If royalties are small enough not to discourage the industry, they would not contribute enough revenue to be worth the cost of collection. They simply would not be cost effective.

We estimate that the total value of 1987 U.S. production from hard rock mines in U.S. is about $7,200 million. We further estimate that about 45% or $3,240 million can be attributed to production from public land. If a uniform, moderately punitive royalty of 1% were assessed, the value of the royalty would only be $32.4 million. One wonders, would this pay for the cost of collection? The potential revenue from hard minerals even at the ruinous rate of 8% would yield

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[7] Tilton, J. E., 1987, Changing trends in metal demand and the decline of mining and mineral processing in North America: Colorado School of Mines Conference on "Public policy and the competitiveness of U.S. and Canadian metals production," Golden, CO.

$259 million. This is hardly significant when compared with the $3,700 million collected from oil and gas royalties.

Royalty is not a new idea. President Nixon considered royalties on hard mineral production when parts of the mineral stockpile were sold. Upon examination, it was determined that royalty revenue from hard mineral production was not large enough to bother with.

The economics of hard minerals should not be confused with those of oil and gas. A royalty on hard minerals that is not punitive does not appear to be large enough to be worth the cost of its collection.

A ROYALTY WILL CHANGE THE WAY BUSINESS IS CONDUCTED

The individual explorer is critical to the efficiency of the exploration/ development process. The nature of the exploration business has changed as a result of the metals depression of 1982. Most companies no longer engage in "grass roots" (generative) exploration. This role is filled by independent exploration scientists and prospectors. Increasingly, companies rely on this cadre of small business people to discover and promote mineral prospects. Thirty-four of 43 gold mines (80%) that pay production royalties to Nevada also pay royalties to individuals or small companies. These royalties average 4.2% of the value of production. In spite of terrible odds, the possibility of earning this royalty is the incentive that motivates this unsalaried, but fundamental sector of the exploration business.

If the government imposes a royalty, it will be borne by these small businesses, not by the mining companies. Because mineral deposits can bear only so much royalty, a government royalty bites the finder not the producer. A federal royalty will remove the incentive for the independent geologist or prospector to explore on public land. Accordingly, fewer discoveries will be made on public land, and any revenues therefrom will be diminished.

Exploration is discouraged even on private land. Old mining districts are attractive geologic targets except for the prospect of CERCLA liability. This risk, compounded upon others inherent in the proposed legislation for public land will force the industry to move overseas.

Policy makers must face up to the consequences of a brain drain in this sector at the same time when enrollment in geoscience and engineering at universities is at an all time low.

ENVIRONMENTAL PROTECTION

The industry is already constrained by the terms of FLPMA, and other land use regulations. It is not inappropriate, however, to direct the Secretaries to to ensure that mining is carried out in an environmentally sensitive manner.

Reclamation standards must be realistic given the physical and economic constraints under which the industry operates. Because local conditions are so varied, and circumstances and technology are so site specific, MEC believes that reclamation is better addressed by the states. The Colorado Mined Land Reclamation Act is held to be a model by the industry. All who have worked with this program find it to be fair, reasonable, and effective. A copy of the statute, as amended, is attached for your consideration. Perhaps it could be furnished to the states as a model.

With respect to bonding, the Colorado Mined Land Reclamation Act provides flexibility for the miner. That act provides that one of five different types of warranties must be received before a permit is issued. This type of flexibility is required, as reclamation bonds are practically impossible to get by any except the large corporations.

LAND USE PLANNING

Hardrock exploration, like land use planning, is a continuing process. Its only hope of being effective is if it is carried out repeatedly over a long period of time. The imposition of additional administrative discretion introduces an unacceptable degree of uncertainty. By exercising this discretion, the government may integrate mineral exploitation with other uses. This sounds good. However, in practice it introduces uncertainty (additional risk) of such a degree that it will jeopardize the production of minerals from public lands. The approval process can work where there is a will to make it work. The system breaks down where the will is lacking, and where the government fails to act, whether by intent or by neglect.

If permits are not approved (for whatever reason), the explorer will be forced from the public lands. Permits may not be issued or may be delayed for a number of reasons: inertia (to prevent mining, the government need do nothing), general attitudes of the administration, or of local bureaucrats (Secretary Andrus's anti-development posture versus Secretary Watt's pro-development stance), or owing to the fact that the agencies are simply under-staffed. Even if plans are approved, powerful and well funded organizations have as their objective to stop mining on the public land. The Sierra Club wants to," . . . put a stop to private interests who want a free hand using public lands," targeting "oil interests, . . . logging, mining, and real estate."[8] Stewart Udall states that "The Mineral Policy Center offers direct help for local groups facing threats from mineral development."[9] These and other organizations with similar political agenda challenge in court the adequacy of any plan they wish to arrest.

The requirement for discretionary permits at every step of the way offers opportunity for obstructionist tactics. Frustrating litigation[10] causes unconscionable delay and thwarts the the best interests of the public as a whole.

CONCLUSION

If the United States is to have a hardrock mining industry, it must be encouraged to explore and produce from the public lands. The particulars of the mining law are complicated and filled with nuances that have profound implications for the industry. Because of these complexities, it would be folly for Congress to abandon the legacy of the General Mining Law. We believe that a workable result can be produced only if Congress solicits and receives the full cooperation of the mining industry. The Minerals Exploration Coalition stands ready to offer expert counsel regarding the principles, the substance, or the details of any aspects of mining law.

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[8] Sierra Club membership enrollment form and letter, 1989: Sierra Club, San Francisco, California.

[9] Udall, S.L., 1988, A letter from Mineral Policy Center Board Chairman: Clementine, v.1, Autumn, p. 1.

[10] e.g. "hundreds of lawsuits and actions initiated by the Club," Sierra Club membership enrollment letter, 1989.

STATE OF COLORADO
Roy Romer, Governor

DEPARTMENT OF NATURAL RESOURCES
MINED LAND RECLAMATION DIVISION
FRED R. BANTA, Director

COLORADO MINED LAND RECLAMATION ACT

34-32-101 *ET SEQ.*, C.R.S. 1973 AS AMENDED

COLORADO MINED LAND RECLAMATION BOARD

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STATUTE PRINTED AS AMENDED THROUGH THE 1988 LEGISLATIVE SESSION

(Rev. 7/88)

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Mined Land Reclamation

ARTICLE 32

Colorado Mined Land Reclamation Act

Editor's note: The substantive provisions of this article were repealed and reenacted in 1976, causing some addition, relocation, and elimination of sections as well as subject matter. (For the historical record of this article, known as the "Colorado Open Mining Land Reclamation Act of 1973", prior to 1976, see this article as contained in the original Volume 14, Colorado Revised Statutes 1973, including amendments thereto through L. 75 as contained in cumulative supplements to said volume.)

34-32-101. Short title.
34-32-102. Legislative declaration.
34-32-103. Definitions.
34-32-104. Administration.
34-32-105. Mined land reclamation board — created.
34-32-106. Duties of the board.
34-32-107. Powers of board.
34-32-108. Rules and regulations.
34-32-109. Necessity of permit — application to existing permits.
34-32-110. Limited impact operations.
34-32-111. Special permits — ten-day processing.
34-32-112. Application for permit — fee — notice.
34-32-113. Prospecting notice — reclamation requirements.
34-32-114. Protests and petitions for a hearing.
34-32-115. Action by board — appeals.
34-32-116. Duties of operator.
34-32-117. Warranties of performance — warranties of financial responsibility — release of warranties.
34-32-118. Forfeiture of financial warranties.
34-32-119. Operators — succession.
34-32-120. Permit refused defaulting operator.
34-32-121. Entry upon lands for inspection.
34-32-122. Fees, civil penalties, and forfeitures — deposit.
34-32-123. Operating without a permit — penalty.
34-32-124. Failure to comply with the conditions of an order, permit, or regulation.
34-32-125. Conflict with "Colorado Surface Coal Mining Reclamation Act".

34-32-101. Short title. This article shall be known and may be cited as the "Colorado Mined Land Reclamation Act".

Source: R & RE, L. 76, p. 724, § 1.

Law reviews. For article, "Severed Minerals as a Deterrent to Land Development", see 51 J. 467 (1974). For article, "Cumulative Impact Assessment of Western Energy Development: Will it Happen?" see 51 U. Colo. L. Rev. 551 Den. L. J. 1 (1974). For article, "1974 Land Use Legislation in Colorado", see 51 Den. L. (1980). For article, "Liabilities of Nonoperating Mineral Interest Owners", see 51 U. Colo. L. Rev. 153 (1980).

Senator Bumpers. Senator McClure, Mr. Udall has to leave. You said you had a question.

Senator McClure. I have just one question of Mr. Udall, and I ask it to make sure that I heard correctly. You turned to Mr. Hocker to fill in the details, and if I read what he was saying correctly, there are three major things that you are looking for. One is the question with respect to patent; the second is the question of royalty; and the third is the right of the government to say no, there are other higher and better values.

First, Mr. Hocker, did I read you correctly in saying those three things?

Mr. Hocker. These are the highlights.

Senator McClure. You agree with that?

Mr. Udall. Yes.

Senator McClure. Thank you. I will not hold you any longer.

Senator Bumpers. Go ahead, Stewart, if you wish to leave. I have no questions.

Mr. Udall. Thank you.

Senator Bumpers. Mr. Snow, you catalogued a series of instances where finding minerals cost $13 million each and perfecting one cost $40 million. You talked about tens of millions of dollars in every instance, and you closed by saying my bill would drive you out of business.

Would raising the filing fee from $10 to $100 on a claim put you out of business?

Mr. Snow. It would put my wife and I out of business.

Senator Bumpers. I will loan you the extra $90 if you find a claim, because I do not want you put out of business but I cannot imagine a company spending $13 million for——

Mr. Snow. You misunderstand me, Senator. I no longer work for a company. I work for my wife—I mean I work with my wife. [Laughter.]

Senator Bumpers. You probably got it right the first time. [Laughter.]

My question is does this extra $90 for filing a claim put your wife out of business? Does this put AMAX or any of those companies out of business?

Mr. Snow. No, sir. It puts the juniors out of business.

Senator Bumpers. How many juniors are out there spending $13 million per find?

Mr. Snow. None, sir. The juniors are doing what we are trying to do now. There is now a void in the industry where the large companies do not have the resources to do the generative exploration. They depend on independent exploration scientists and junior companies to bring them properties.

Senator Bumpers. If we raised that fee to $50 instead of $100, would that still put them out of business?

Mr. Snow. Perhaps not; the filing fee, no.

Senator Bumpers. A 20 acre claim for $50? Do you think a 20 acre claim for $50 might not put them out of business, but a 20 acre claim for $100 would? Is that what you are saying?

Mr. Snow. I do not need one claim. I need 40 claims to cover a place that I have an exploration concept for. I can afford $4,000. I cannot afford $40,000.

Senator BUMPERS. If you had 40 claims at $100 each, that is $4,000.

Mr. SNOW. That is what I say.

Senator BUMPERS. You said you could afford that.

Mr. SNOW. That is for assessment work.

Senator BUMPERS. Are you seriously going to tell this committee now, and this is what you want the record to show, that raising the fee from $10 to $100 for a 20 acre claim will put you out of business, put your wife out of business?

Mr. SNOW. Now are we talking about assessment work or filing work?

Senator BUMPERS. We are just talking about staking claims. That is what this bill does.

There is a diligence requirement.

Mr. SNOW. All right, we are not talking about the diligence requirement.

Senator BUMPERS. No, we are talking about the filing fee for establishing a claim on a 20-acre tract going from $10 to $100.

Mr. SNOW. It is not just $10. I also have to pay the state $25.

Senator BUMPERS. Okay. Is that going to put you out of business?

Mr. SNOW. What it does, Senator, is it adds to the risk. This business is a risky business. Any money that is put up front is speculation money. If we cannot get some return out of that, we are not going to invest it here. We have other alternatives. We can go to British Columbia, we can go to Mexico, we can go to Australia.

Senator BUMPERS. You sell your claims once you find them to the majors, do you not?

Mr. SNOW. If I ever found anything, I would.

Senator BUMPERS. How does it affect the mining industry to allow them to patent the minerals but not the surface?

In other words, if you come to me and you say I have 500 acres in claims out here and I have decided that it has a very valuable vein of gold or whatever else in it, and you want a patent to it and you are entitled to a patent, and you say I want to mine the coal, I am not interested in selling this land to a ski resort for $13,000 an acre or to a gambling resort in Las Vegas, I want to mine it, that is what the Mining Law is supposed to do, is it not, to encourage mining?

Mr. SNOW. I hope so.

Senator BUMPERS. It is not supposed to be adding to ski lodges, is it, or allowing some guy to pay $2.50 per acre for land and selling it for $13,000. That is not the purpose of the Mining Law, is it?

Mr. SNOW. No, sir.

Senator BUMPERS. So how are you hurt or how is the mining industry hurt when you say to them, sure, you can have the minerals, but if when you are finished the surface belongs to the United States Government, we are not going to give this away forever; we will let you mine the minerals? You are a miner, and you say you want the minerals. How are you hurt?

Mr. SNOW. I do not know how we are hurt.

Senator BUMPERS. Good.

Mr. Delcour, let me ask you this question. You have seen all these stories. You have seen the GAO report, which you make light of; but nevertheless, most people around here have a high degree of confidence in the GAO, and they do pretty good work. We rely on them because we want the nitty gritty information.

Completely aside from that, you keep reading the stories. I read you one out of the Reno newspaper there a while ago where some guy is getting $250,000 from Energy. You saw where the GAO said, for example, lands had sold for about $4,400 that were worth $47 million.

Now would you agree with me that as long as you keep seeing those newspaper articles all over the United States and you keep seeing editorials in the Washington Post and the Los Angeles Times and all the other papers in the country about this rape and pillage of the public domain, this issue is not going to go away.

So why would it not be to your advantage to join with me in crafting a mining policy?

When you lease land or whatever you do on private lands, you have to pay a royalty. Of the $13 billion that came in in revenues last year from minerals in these states that I mentioned, somewhere between 50 and 70 percent of that came off private lands for which the mining industry paid anywhere from 2 to 10 percent royalty.

Now why should the United States Government be treated less favorably than that?

Mr. **Delcour**. Well, Senator, that is a long question.

Senator **Bumpers**. Just take the first one first. As long as people can take this land that they bought for $2.50 an acre and dispose of it for all these handsome prices, you will agree with me that that does not make the mining industry look too hot, does it?

Mr. **Delcour**. No, it does not.

Senator **Bumpers**. You do not like that any better than I do, do you?

Mr. **Delcour**. I sure do not, and that is why we spent considerable effort to look into the actual assertions in that GAO report.

I do not make light of the report at all. My point was simply to suggest that the GAO is wrong in practically every single instance.

I do not make light of it. What I suggest is that the report not be viewed as a serious piece of work in connection with this debate.

Senator **Bumpers**. Well, we are agreed, then, on one thing.

Now let me ask you one other question before I get to the other one that I intended to ask Mr. Burford and in the interest of time I did not.

I agree, I think, with Senator McClure, if I understood him a moment ago. As a matter of fact, my preference would be to do away with this annual requirement of $100 worth of work. I think there is more degradation going on to the land by requiring that which serves utterly no useful purpose. I think we ought to let you spend $100, perfect your claim for five or 10 years or whatever we agree on, and at such time as you decide you want to mine that and ask for a patent, we will deal with it.

This is just a Mickey Mouse operation. Despite what Mr. Burford said, BLM cannot even possibly monitor all those annual reports they are getting. They cannot even monitor whether any mining is going on after they patent the land or before they patent the land. So this is all a bunch of nonsense. I want a bill that is realistic and that you can live with and that will not put you or Mr. Snow's wife out of business.

I just think that you do more damage with these annual requirements of somebody digging a trench out there. The GAO report said one thing you would agree with, and that is that it is not moving that claim any closer to mining. It is just doing a little Mickey Mouse operation to stay in compliance with the law.

Do you agree with that?

Mr. DELCOUR. I would agree that a 10 foot trench 2 feet wide does not typically——

Senator BUMPERS. Does not serve any purpose.

Mr. DELCOUR. Does not serve any purpose.

Senator BUMPERS. You see the newspaper advertisements. They say call us to get your trench dug and we will do it for you.

Mr. DELCOUR. I would like to say in response to that, Senator Bumpers, anyone who took these folks up on their offer will be looking for some fairly severe trouble relative to their mining claims because they sound to me like people who are saying we will do nominal assessment work, the $100, we will pay for the courthouse for you, and then we will walk away.

Now I can tell you to a moral certainty that if these individuals do not have a valid discovery and if they are not continuously occupying the ground searching for valuable minerals, they have no right relative to the United States or anyone else as far as that is concerned.

Senator BUMPERS. I could not agree more on that, Mr. Delcour. We are in total agreement.

Mr. DELCOUR. The nice thing about the current law is there is no action required by the government to cause that result to come to fruition. They have no right period.

Senator BUMPERS. I think we can spend too much time on that, but let me ask you about the royalty.

Why is that you are willing to pay the private land owners 2 to 10 percent royalty but you are not willing to pay the United States a royalty?

Mr. DELCOUR. I think Mr. Ary probably summed up my view on the royalty. I do not think the royalty is the burning issue from the standpoint of the mining industry.

Senator BUMPERS. I think we have about got us a bill here.

Mr. DELCOUR. There are matters related to the royalty that require serious discussion, however. There are two components to a royalty, of course. There is the rate, and then there is the base to which the royalty is applied.

I think it is fair to say that the more that is known about mineralization prior to the time of the agreement which establishes the royalty, the higher the rate will be. Where caps on royalties are included, a higher percentage might be made available.

Royalties are very complicated things, and they are very difficult to generalize. I read your bill to propose a royalty of 8 percent of some kind of gross value which I presume may mean true gross; that is to say, you add up the ounces or pounds and multiply it by the prices found on the London Metal Exchange or some such thing and you take 8 percent of that number. That would be an extraordinarily high royalty. As you shrink the base, of course, the percent becomes less important.

So yes, we pay royalties on private lands. I think in my testimony what I tried to emphasize was the fact that any royalty is compatible with the existing Mining Law. You could reserve a royalty right in the existing Mining Law. You do not have to repeal the Mining Law to do that.

Now how do you structure a royalty? It is a very difficult thing to do. I mean, I think if we were to bring you 100 mining agreements containing royalty provisions, if you found fewer than 50 different types of structures for royalties, I would be somewhat astonished.

Possibly we can come up with one. It seems to me in any case, if you want to pursue royalty you ought to pursue it on the basis of some type of net and that it ought to be at least a serious effort made to make it somehow representative of the types of royalties that are available in the private sector so that you do not put the public land producer at a competitive disadvantage to the private land producer.

It would not be appropriate for me to speculate, but I suppose we could survey and perhaps ascertain what royalties are being paid in the private sector, but they are certainly nowhere 8 percent of true gross.

Senator BUMPERS. I am not wedded to that figure.

Let me make just one final point, and it deals with reclamation. We have a host of photographs, and you have seen them, where miners have walked away from a devastating situation. The BLM did not require a bond——

Mr. DELCOUR. I have not seen those.

Senator BUMPERS. Well, we will show them to you.

Mr. DELCOUR. Since the passage of FLPMA?

Senator BUMPERS. I would expect so. I cannot give you the definitive time, but the pictures are in my office. If you will come by, I would be delighted to show them to you. I had them blown up and used them at the press conference yesterday.

I can assure you there are a lot of pockmarked places in the west where miners have gone out there and done irreversible damage and walked away from it. I do not know how BLM decides to do it, but they require bonds on a sort of an ad hoc basis. If you do not collect a bond on the front end, you cannot promise reclamation.

The people who do hardrock mining are subject to a lot of the laws as has been pointed out here, but unlike coal miners, they are not subject to the Surface Reclamation Act. Unless we get a bond, we have no way of guaranteeing that that land is going to be restored to anything like presentable condition.

So that is just a statement more than a question.

Mr. DELCOUR. Recognizing it is a statement, I would simply offer that there are problems with bonding. They are extraordinarily expensive. They are increasingly difficult to obtain. State reclamation laws typically require bonding. The industry is certainly used to providing that type of bond.

Of course, if there is more than five acres disturbance, I believe it is the practice of BLM to require a bond anyway. It is always a requirement of the Forest Service——

Senator **Bumpers**. The Forest Service always requires a bond, and I do not know for the life of me why BLM does not.

Mr. **Delcour**. I think, Senator, if you wanted to perform a valuable service in terms of both getting tighter regulation on reclamation and simultaneously making these lands more readily available, you might give some thought to how this lack of bonding capacity might be resolved. It is a terrible problem.

I do not know if something like a workmen's compensation type of funding that essentially socializes those costs might be appropriate, but I can tell you if Geoff Snow is having trouble with his claims, he is not going to get a bond, and it is not just that size of an operation. There are substantial operators who are not bondable.

So I think if you pursue bonding, I would hope that you would at least provide for a menu of bonding options and not necessarily the type of thing that you go to an insurance company to have written.

Senator **Bumpers**. Your point is well taken.

Senator McClure, Mr. Snow said they were going to drive him offshore. I have a comparison here between the United States, Australia, South Africa and Canada mining laws, and I will put this in the record without objection.

[The information referred to follows:]

DEVELOPMENT OF HARDROCK MINERALS ON GOVERNMENT LANDS:
An Analysis and Comparison of the Laws of the United States, Australia, Canada, and South Africa

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DEVELOPMENT OF HARDROCK MINERALS ON GOVERNMENT LANDS:

An Analysis and Comparison of the Laws of the United States, Australia, Canada, and South Africa

SUMMARY

This report provides an overview of the mining laws of the United States, Australia, Canada, and South Africa that govern the development of "hardrock" minerals on government owned lands. These countries were chosen because each has major hardrock mineral resources and industries. Hardrock minerals are generally regarded as those minerals, usually metalliferous, that are not oil, gas, coal, sulphur, potassium, and phosphate, and are not common materials. Hardrock minerals usually include gold, silver, copper, lead, zinc, magnesium, nickel, tungsten, bentonite, barite, feldspar, and fluorspar. The report is limited to an analysis of the laws governing development only on lands that are owned by the government, whether federal, provincial, or (other than as to the United States) state.

A chart comparing the laws of each country with respect to regulation of exploration; the type of tenure the mineral developer obtains; the revenues paid to the government; environmental protection; and restrictions on foreign ownership follows. Then the laws of each country are analyzed in narrative form, with a summary of each system at the front of each section.

	UNITED STATES	AUSTRALIA
Regulation of Exploration	Not regulated by the mining laws	Miner's rights; prospecting and exploration licenses, terms from 2 to 5 years, renewable; maximum area 200 km; annual expenditure requirements; limited amount ore removable for sampling or sale
Tenure	Valid claims can be developed; full title to lands within a claim may be obtained	Mining lease; 21-year term, renewable; maximum area 10 square miles; minimum expenditure requirement
Revenues to Government	None from mineral development; $2.50/acre or $5.00/ acre for full title	Rent and royalties; rates from 2 1/2% to 7 1/2%
Environmental Protection	Not regulated by the mining laws; other laws regulate pollution and surface management	Mining law made subject to general environmental laws; environmental impact and land rehabilitation measures (N.S.W.); rehabilitation bonds and fund (Vict., S. Australia)
Foreign Ownership	Limited to citizens, those intending to become citizens, or corporations organized under the laws of any state	Scrutinized to ensure Australian equity, control, and national interest

	CANADA	**SOUTH AFRICA**
Regulation of Exploration	Exploration licenses and permits; nominal fees; non-transferable; maximum of 5,165 acres	Prospecting permits: 12-month term, 630 square meters; prospecting lease: discretionary term and area, transferable, work must be undertaken
Tenure	21-year mining lease; renewable	Mining lease; discretionary term and area; work must be undertaken
Revenues to Government	Based on value of output; maximum 12%	Discretionary, as recommended by Mining Lease Board
Environmental Protection	Patchwork of mining and general environmental laws and policy	Rehabilitation of land; other restrictions imposed
Foreign Ownership	Restriction on foreign takeovers	None

DEVELOPMENT OF MINERALS ON FEDERAL LANDS IN THE UNITED STATES

SUMMARY

In the United States, different laws and regulations govern the development of federal minerals depending on the type of lands and the type of minerals involved. This section will present an overview of the general categories of mineral development regulation.

The development of federally owned "hardrock" minerals, such as gold, silver, copper, etc. is governed principally by the Mining Law of 1872. Under this act, individual citizens and corporations may enter certain federal lands, locate, and record a claim to the minerals. There are no separate statutory provisions on prospecting or exploration, but these activities are subject to rules and regulations. Once a valid claim is located, the claimant obtains a possessory right to the area within the claim and may extract the minerals. There are no diligent development requirements; a claim may be maintained by submitting an annual filing with the government and performing $100 worth of work on the claim each year. Upon proof of a valuable mineral discovery and performance of $500 worth of assessment work, a claimant may pay either $2.50 or $5.00/acre and obtain a "patent" or government deed to the lands within a claim. If a claimant does so and the claim is determined to be valid, the claimant is given full fee title to the lands, both surface and subsurface, and subsequently may use the lands for any purpose, mineral or otherwise.

The federal government is not paid any royalties, rents, or other form of payment for the extraction of hardrock minerals.

The Mining Act of 1872 does not contain any provisions that directly require environmental protections. Rather, environmental constraints are derived from other statutes that address particular forms of pollution, and from other statutes governing the management of the surface of the lands. These laws can vary considerably depending on the type of lands and what other purposes govern their management.

In contrast to the hardrock minerals, certain other minerals such as coal, oil and gas, are developed under the Mineral Leasing Act and the Mineral Leasing Act for Acquired Lands. Under these laws, a qualified lessee receives only the right to develop the mineral in question and does not obtain title to the lands. Foreign citizens may own an interest in a lease if they are from a county that grants similar privileges to citizens of the United States. A plan of operations is required before extraction of coal, oil, or gas may begin. Also, the laws on coal mining and the surface mining of coal in particular contain environmental protection provisions. The federal government realizes (with certain exceptions) bonus bids, certain fees for costs, land rents, and royalties (usually a minimum of 12.5%) from the leasing of its minerals.

Common variety minerals such as sand and gravel are sold under the Materials Disposal Act.

HARDROCK MINERALS

Those lands that the United States obtained from a foreign sovereign (the lands in the Western United States) are known as "public domain" lands and generally are governed by a different set of laws from those lands the United States government "acquired" from a state or an individual. In addition, different laws govern the development of different types of minerals.

"Hardrock" minerals on open public lands and in national forests created from the public domain may be developed under the federal mining laws, consisting principally of the Mining Act of 1872.[1] Some public lands may be withdrawn from the operation of the mining laws and hence are not open to entry for mineral development. Hardrock minerals in national forests that are comprised of acquired lands may be leased by the Secretary of the Interior with the consent of the Secretary of Agriculture.[2] The system for the development of leased hardrock minerals is similar to that for leasable minerals discussed below, and hence not similar to the development of hardrock minerals on public domain lands discussed here.[3]

The mining laws were enacted at a time when the West was still unsettled and it was considered vital to encourage both settlement and the development of our nation's mineral resources. Since many people already were on the federal lands, the laws were worded very generally in order to legitimize the presence and activities of the miners. Thus, it is stated that the establishment of mining claims is "regulated under regulations prescribed by law, and according to the local customs or rules of miners in the several mining districts, so far as the same are applicable and not inconsistent with the laws of the United States."[4]

Mineral access and development is limited to citizens of the United States or those who intend to become such,[5] or to corporations incorporated under the laws of any state.[6]

The law does not specify separate provisions governing the prospecting and exploration stages, but the regulations of the Bureau of Land Management and the agency with jurisdiction over the surface lands apply to this stage. If a claimant locates, records, and maintains a claim on available lands in accordance with the applicable laws and regulations, the claimant is entitled to occupy and possess the lands within the claim and to develop the minerals therein. There are no diligent development requirements; a claim may be maintained merely by making annual record filings and by expending $100 worth of labor or improvements on the claim annually.[7] A claimant also may complete at least $500 worth of work on a claim and apply for a patent and obtain full title to the lands.[8] Thereafter, the lands may be used for any purpose, mineral or otherwise, and are private inholdings among lands otherwise owned by the federal government, a fact that can cause management problems.

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[1] R.S. 2319 *et seq.*, derived from the Act of May 10, 1872, ch. 152, 17 Stat. 91, codified at 30 U.S.C. 22 *et seq.*

[2] Reorganization Plan No. 3 of 1946, 5 U.S.C. Appendix, 60 Stat. 1097.

[3] 43 C.F.R. 3500; 3560.

[4] 30 U.S.C. 22.

[5] 30 U.S.C. 22.

[6] 30 U.S.C. 24.

The federal government does not receive bonuses, land rentals, or royalties from the development of hardrock minerals. If lands are patented, the government receives the fees set in the 1872 Act: $2.50/acre for a placer claim or $5.00/acre for a vein or lode claim. Unless otherwise restricted, as where the federal government owns only the mineral estate, patented lands may be used for any purpose since full ownership usually passes. This fact can result in problems in managing the remaining federal lands.

The federal mining laws do not contain any environmental controls. Pollution from mines may be regulated under separate environmental statutes, and some environmental controls may be imposed as a result of provisions in whatever statutes govern the management of the surface of the lands. Some of these management statutes, however, speak only in terms of management objectives and lack the specificity as to mineral development activity that would provide greater control and clarity to the regulation of mining and mineral activity. For example, the principal source of environmental controls on mining on the federal public lands managed by the Bureau of Land Management are provisions in the Federal Land Policy and Management Act of 1976 that require that the lands be managed in a manner that will "protect the quality of ...ecological, environmental, air and atmospheric, water resource and archeological values"; secure "compliance with applicable pollution control laws, including State and Federal air, water, noise, or other pollution standards or implementation plans"; and include "any action necessary to prevent unnecessary or undue degradation of the lands."[9]

The regulations governing hardrock mineral extraction currently require bonding and a plan of operations for mines involving more than 5 acres, but the regulations do not apply to all mineral development.[10]

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[7] 43 U.S.C. 1744, 30 U.S.C. 28.

[8] 30 U.S.C. 29.

[9] Act of October 21, 1976, Pub. L. No. 94-579, 90 Stat. 2744, codified at 43 U.S.C. 1701(a)(8), 1712,(c)(8), and 1732(b) respectively.

[10] For example, the extraction of minerals from the approximately 30 million acres of lands patented under the Stockraising Homestead Act of 1916 are not governed by the general regulations. The surface of these lands is in private ownership, the federal government having reserved the mineral estate.

MINERAL LEASING

In contrast to the system described above for the development of hardrock minerals, certain federally owned deposits of specified minerals[11] are developed under a leasing system pursuant to the Mineral Leasing Act of 1920[12] and the Mineral Leasing Act for Acquired Lands.[13] The Secretary of the Interior administers the leasing programs for the federal government through the Bureau of Land Management. Certain of the features of the federal leasing systems for oil and gas and for coal will be summarized briefly to provide a comparison for the current system pertaining to the development of hardrock minerals.

Oil and Gas

Under the oil and gas leasing provisions, the Secretary determines which federal lands are available and suitable for leasing and offers tracts initially through a competitive bidding process.[14] Tracts that are not leased are then available for leasing without competitive bidding for a period of two years. At the end of that time, if no applications are received for a tract, it again returns to the pool of lands to be considered for competitive bidding.

The government receives royalties of not less than 12.5% "in amount or value of the production removed or sold from the lease"[15] for competitive leases, and 12.5% in amount or value of the production removed or sold from a noncompetitive lease.[16] In addition, the federal government receives some revenues from bids on the leases, miscellaneous fees, and annual rentals of not less than $1.50/acre during the first 5 years of a lease and not less than $2/year for each year thereafter. After discovery of oil or gas in paying quantities, minimum royalties in lieu of rental may be paid.

A competitive lease is for a primary term of five years and a noncompetitive lease for a primary term of ten years, and each lease continues after its primary term if oil or gas is produced in paying quantities.[17]

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[11] Coal, phosphate, sodium, potassium, oil, oil shale, gilsonite, gas and special tar sands.

[12] Act of February 25, 1920, ch. 85, 41 Stat 437, codified at 30 U.S.C. 181, *et seq.*

[13] Act of August 7, 1947, ch. 513, 61 Stat. 913, codified at 30 U.S.C. 351 *et seq.*

[14] The consent of the Secretary of Agriculture is required if the lands are in National Forests. 30 U.S.C. 226(h).

[15] 30 U.S.C. 226(b)(1)(A).

[16] 30 U.S.C. 226(c).

[17] 30 U.S.C. 226(e).

Surface disruption of oil and gas development activities is controlled through statutorily required plans of operation, which must be approved by the Secretary of Agriculture if the development is on National Forest lands, or by the Secretary of the Interior if the development is on other federal lands. However, no particular terms and conditions of the plans of operations are specified in the Mineral Leasing Act. Bond or other surety sufficient to ensure the timely and complete reclamation of the lease tract and the restoration of lands or surface waters adversely affected by the lease operation is required under the act. A lease may not be issued to a person or corporation that failed to comply in any material respect with the reclamation requirements and other standards established for any prior lease. A lease may be cancelled for nonproduction.

Coal

Coal deposits also usually are leased competitively,[18] but some isolated tracts may be leased noncompetitively. The government receives a royalty on coal of not less than 12.5% of the value of the coal, as defined by regulation, but the Secretary may set lesser royalties for underground mining operations,[19] and may waive, suspend, or reduce the rental or minimum royalty if the Secretary adjudges this necessary to promote development or if the leases cannot successfully operate under the terms provided.[20]

A coal lease is for a term of twenty years and for so long thereafter as coal is produced annually in commercial quantities from the lease. Any lease that is not producing in commercial quantities at the end of ten years is to be terminated,[21] and the Secretary is not to issue a lease for any leasable mineral to a leaseholder who has held a coal lease for ten years but has not produced coal in commercial quantities.

There are relatively extensive provisions pertaining to the environmental regulation of the mining of federal coal deposits. With certain exceptions, a lease sale may not be held unless the lands containing the coal deposits have been included in a comprehensive land-use plan and the sale is compatible with that plan. Leases for lands the surface of which is managed by a federal agency other than the Department of the Interior may only be issued with the consent of that other federal agency and on the conditions that agency prescribes for the use and protection of the nonmineral interests in the lands.[22] The Secretary must consider various factors involving the impacts of the coal mining before issuing a coal lease.[23] Coal leases must contain provisions requiring compliance with the federal water pollution and clean air acts, and other statutes also may impose additional environmental controls or provide authority for environmental regulation. Before beginning activities on a leasehold which might cause significant disturbance of the environment, a lessee must submit for the Secretary's approval an operation and reclamation plan. If the surface of the lands is under the jurisdiction of another federal agency, that agency must consent to the terms of approval of such a plan.

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[18] 30 U.S.C. 201 *et seq.*

[19] *Ibid.*

[20] 30 U.S.C. 209.

[21] 30 U.S.C. 207.

[22] 30 U.S.C. 201((a)(3)(A)(iii).

[23] 30 U.S.C. 201(a)(3)(C).

The Surface Mining Control and Reclamation Act[24] imposes additional extensive environmental controls if the coal is to be surface mined, and some federal lands may be designated as unsuitable for surface coal mining altogether. Details on environmental protection and reclamation are specified and include restoration of land contours and revegetation and protection of water courses and drainage patterns.[25]

MINERAL MATERIALS

Federal common materials, such as sand and gravel, are disposed of through sales under the Materials (Disposal) Act of 1947,[26] unless another form of disposal is otherwise authorized. The Secretary of the Interior, or the Secretary of Agriculture where the National Forests or other lands withdrawn for the purposes of that Department, is authorized to develop rules and regulations for such sales and to specific what constitutes adequate compensation. Sales generally are to the highest responsible qualified bidder, but may be negotiated in some instances, as when the contract is for the disposal of materials to be used in connection with a public works improvement program on behalf of a federal, state, or local governmental agency and delay is undesirable.[27]

Revenues from the sale of materials on public domain lands are disposed of in the same manner as moneys received from the sale of public lands, except that moneys received from the disposal of materials by the Secretary of Agriculture are disposed of in the same manner as other moneys received by the Department of Agriculture from the administration of the lands involved. Revenues from disposal of materials from school section lands in Alaska are set apart as separate and permanent funds.[28]

The Materials Act does not contain any specific environmental controls and therefore environmental regulation rests on the authority of other statutes. Under the relevant regulations,[29] the authorized officer disposing of the materials is to determine if a proposed operation will cause unnecessary or undue degradation, and may require the applicant to submit mining and reclamation plans, but these plans are not necessarily required.

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[24] Act of August 3, 1977, Pub. L. No. 95-87, 91 Stat. 445, codified at 30 U.S.C. 1201 *et seq.*

[25] 30 U.S.C. 1265.

[26] Act of July 31, 1947, c. 406, 61 Stat. 681, codified at 30 U.S.C. 601 *et seq.*

[27] 30 U.S.C. 602.

[28] 30 U.S.C. 603.

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[29] 43 C.F.R. 3600.

AUSTRALIA

SUMMARY

Laws concerning the exploration and development of minerals in Australia are enacted by the states and territories. This section presents a glimpse of these laws, with an emphasis on Western Australia, a leading mining state that has passed new legislation adopting modern principles and practices.

Exploration for and development of minerals, that are vested in the Crown, is allowed under graded mining tenements culminating in a mining lease, akin to a lease at common law, allowing the holder the exclusive right to the minerals discovered. The states and territories are entitled to rents on the land and royalties on the minerals. Large-scale mineral development is often undertaken through a negotiated agreement, which is then ratified by an act of the State legislature.

Environmental protection requirements specifically directed at mining operations are written into the mining laws or the mining provisions are made subject to general environmental laws. Measures for the protection of the environment are undertaken both prior to the grant of mining rights and after mining operations have commenced. Special mining courts have been established to administer the mining laws.

INTRODUCTION [30]

Australia is self-sufficient in most economically important minerals and is an exporter of many minerals. The ownership of minerals, including those under private land is generally vested in the Crown, as represented by the Commonwealth, the states and territories. Under the Australian Constitution, mining is a residual power over which the States and Territories have primary control.

Each state and territory has long-standing statutes concerning the prospecting for and the working of mineral deposits. These laws were enacted for conditions allowing only small scale and labor-intensive mining. While some jurisdictions have modernized their laws, in many respects they remain unsuited for large-scale capital-intensive modern mineral development. This inadequacy has increasingly resulted, particular in two jurisdictions, in what are known as "ratified agreements"--contracts for large-scale mineral development negotiated outside the terms of the mining laws, that are then ratified by acts of the state legislature.

This report examines the mining laws under the following headings: exploration and development, royalties, environmental regulations and miscellaneous provisions. Given the extent of the jurisdictions and their laws, only selected provisions are reported.

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[30] Based on Economist Publications, Country Profiles, August 1988. The Commonwealth of Australia is comprised of the States of New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia, and the Northern Territory and the Australian Capital Territory.

EXPLORATION AND DEVELOPMENT

The legislation while differing in detail between the jurisdictions is broadly similar in principle. The enactments mainly deal with mining on land held by the Crown, but they also confer rights to mining on private land. Some jurisdictions also have mineral-specific statutes, for example for coal and uranium.

There are various types of mineral rights and licenses. The former law of Western Australia had thirty-nine different titles, many of which were inapplicable to modern conditions.[31] A new law enacted in 1978 reduced them to three mining tenements which are discussed here.[32]

Miner's right

The prerequisite for the exploration of mineral is the miner's right available in most jurisdictions. Any person may stake out a miner's right entitling him to occupy land in return for a nominal yearly fee. The right has been described as "the licence which enables persons to acquire mining claims and certain mining tenements and it merely enables a person to avail himself of the benefits of the mining legislation."[33]

Western Australia's Mining Act perpetuates the concept of the miner's right, but it is no longer of any real importance because no exclusive rights are conferred under it. While §20(2) authorizes the holder of a miner's right to, inter alia, pass over Crown land with employees and equipment for purposes of prospecting and marking out of any land and to remove samples, a non-holder of a miner's right is not prevented from doing those things. A miner's right in Western Australia is subject to the payment of a nominal fee. It is not transferrable and is not limited in term.

In South Australia, the Mining Act 1971, §20 restricts a miner's right to one year, renewable for successive one year periods on payment of a prescribed fee. The holder is authorized to prospect for minerals (except precious stones) and to peg out any number of mineral claims in conformity with regulations. When a claim is staked out, a mineral claim must be lodged within thirty days. If accepted, the claimant acquires the exclusive right to conduct mining operations on the area comprised and to apply for a mining lease in respect of that area. The claimant cannot remove any minerals or soil exceeding one tonne unless authorized by a warden's court. Nor does the claim confer a right to sell any minerals recovered, or use them for any commercial or industrial purposes. The claim cannot be transferred.

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[31] Michael Hunt & Michael Lewis, Mining Law in Western Australia 21 (1983), reporting the findings of a Committee of Inquiry in 1971.

[32] A major portion of this report refers to the Mining Act 1978 and Mining Regulations 1981 of Western Australia. The State has been selected on the basis of having a recently revised law on mining. Western Australia is also a leading mining state. Interestingly, in 1906 President Theodore Roosevelt appointed an American geologist, Arthur Veatch, to make a special study of the mining laws of Australia and New Zealand in order to make recommendations to the President on amending the mining laws in the United States. Veatch stated the following in his report:

> The Western Australian mining law is, in short, a wonderfully symmetrical and carefully balanced enactment . . . and . . . contains many suggestive provisions, all of which merit careful consideration.
> (As quoted in Hunt, supra, note 31, at 20).

[33] Andrew Lang, Manual of Australian Mining Laws 13 (1971).

As in Western Australia, a miner's right is not necessary in Tasmania for a person to obtain further mining rights.[34] A number of the jurisdictions provide for consolidated miner's rights in case of a corporation or a missing partnership whereby several miner's rights are consolidated into one.

Among the restrictions applicable to miner's right, Western Australia does not allow a holder to enter Crown land that:

(a) is being used to grow crops
(b) is used as a plantation, airfield, etc.
(c) is within 100 meters of occupied land on which a house is erected
(d) is used as, or is within 100 meters of a cemetery,
or
(e) is the site of or is situated within 400 meters of any water works, dam, well, etc. [35]

The regulations set out the manner in which the holder must work the claim. Generally, work must commence on the claim within a specified period of time and under "labor conditions," a certain amount of work must be carried out by miners. Failure to comply with the labor conditions make a claim liable to forfeiture.

Prospecting license

A prospecting license is issued in Western Australia for an area not exceeding 200 hectares for a term of two years.[36] The license may be extended for a further period of two years. While a prospective licensee has the same rights as granted to the holder of a miner's right, an additional expenditure condition is imposed. The holder must expend $A40 for each hectare with a minimum of $A2,000 during each year.[37] However, if the holder is directly engaged in mining under the license, an amount equivalent to the wages he would have received is deemed to have been expended. The holder may not extract or remove more than 500 tonnes of ore without written approval.

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[34] Mining Act 1929 (Tasm.)

[35] Mining Act 1978, §20(5) (W. Austl.).

[36] Id. §§40 & 45.

[37] Mining Regulations 1981, reg. 15 (W.Austl.). On May 24, 1989, the exchange rate was $A1 = $US0.74.

Regulations in Western Australia also require the filing of an annual report on the operations of the mine. The report must include information on:

(a) methods of exploration
(b) record of geological, geophysical and geochemical investigations carried out
(c) record of all drill holes and excavations
(d) details of material tested and assay result
(e) summary of measured, indicated or inferred reserves
(f) tonnage, grade and value of ore mined
(g) statement of expenditure, and
(h) details of amounts claimed in lieu of wages. [38]

Until 1981, a limit of ten prospecting licenses per holder was imposed. The holders of two or more licenses must provide a bond of $A500 as security for compliance with the conditions of the license.[39] The licensee is required to fill all holes, pits, trenches and other disturbances to the surface of the land and to take steps to prevent fire, damage to trees or other property and livestock.[40]

Western Australia has set out a detailed procedure for the issuance of prospecting licenses, the filing of any objections to their issuance and for appealing the refusal to grant a license.

As to the legal nature of a prospecting license, it is stated:

> A prospecting licence under the Act cannot be characterised as a leasehold interest as it does not have the necessary elements of exclusive possession. However, it is more than a bare licence because it confers not only a right of entry for prospecting purposes but also a right to extract, remove and sell a quantity of ore, albeit limited. [41]

Exploration license

These are granted for more comprehensive development of an area not less than 10 square kilometers and up to a maximum of 200 kilometers.[42] An exploration license is valid for a period of five years, but in exceptional circumstances the duration may be extended for a further period or periods of one year. Generally, the shape of land subject to an exploration license must be rectangular. When the term of the license expires, there is a "cooling off" period of three months before the holder may mark off the same area for another prospecting or exploration license. However, he may mark off and apply for a mining lease for the same area. In applying for a license, details must be given of the proposed method of exploration, the work to be carried out, the estimated amount of money proposed to be expended and the technical and financial resources of the applicant.

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[38] Id. Form 5.

[39] Id. reg. 112.

[40] Mining Act 1978, §46 (W. Austl.).

[41] Hunt, supra, note 31, at 66.

[42] Mining Act 1978, §57 (W. Austl.).

The license entitles the holder to extract and remove 1,000 tonnes of ore for sampling and testing. Unlike under the prospecting license, the ore is not the property of the holder and cannot be treated and sold. A standard condition of the license is that the holder must undertake the exploration of minerals and in the effort expend $A300 per square kilometer with a minimum of $A20,000 per year.[43] A rent of $A18 per square kilometer is also payable annually. A failure to comply with the conditions of the license may lead to its forfeiture. A bond of $A5,000 must be furnished as security.[44] Reporting requirements similar to those in a prospecting license are also applicable. Detailed procedural provisions are also made for the acquisition of exploration licenses, objections to their grant and appeal against refusal to issue them.

Mining lease

A mining lease allows the development and production of minerals discovered under a prospective or exploration license. Under the lease, the leasee becomes entitled to the title to all minerals except in two cases. The mining of iron ore is not permitted unless the lease is specifically endorsed for the purpose. Secondly, the lease may authorize the mining of specified minerals only.

A mining lease is granted for a term of twenty-one years, renewable not as a matter of right for successive periods of twenty-one years.[45] The area under lease may not exceed ten square kilometers and the shape of the area generally must be rectangular. Multiple holdings are permitted. A rent of $A6 per hectare is payable per year. The lease requires an expenditure of $A100 per hectare with a minimum of $A10,000 per year.[46] The license holder's personal labor is taken into account. Reporting requirements, as previously stated, are also applicable.

A refusal to grant a lease is generally not appealable to the courts. The holders of current prospecting and exploration licenses are given favorable treatment in changing them to a mining lease. The lease may be assigned or sublet only with the prior consent of the mining department.

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[43] Mining Regulations 1981, reg. 21 (W. Austl.).

[44] Id. reg. 112.

[45] Mining Act 1978, §78.

[46] Mining Regulations 1981, reg. 31 (W. Austl.).

Ratified agreements

In Western Australia, very few significant mining operations are carried out without a ratified agreement. The written agreement between the miner and the state is ratified by statute thus ensuring that the provisions of the agreement override any inconsistent provisions in the statute.

There are many agreements for the large-scale development of minerals such as iron ore, bauxite, alumina, nickel, uranium, coal, mineral sands, diamonds and salt. Ratified agreements allow the rationalization of developments in which a number of miners with very different approaches may be involved. In such a development, the state does not have to strain in different directions in providing an infrastructure for the project. An agreement is generally designed to operate throughout the life of the project which in some cases may span fifty years.

Ratified agreements have greatly facilitated the early implementation of major resource development in Western Australia and have created a climate encouraging domestic and foreign investment.[47] Other Australian jurisdictions, except for Queensland, do not make as extensive a use of ratified agreements as does Western Australia.

ROYALTIES

The royalties payable to the State of Western Australia on the minerals extracted are set out in regulations.[48] No royalty is payable on gold. The royalties range from 7 1/2 percent on bauxite to 2 1/2 percent on cobalt; on building stone the rate is 50 cents per tonne.

The royalties are payable within thirty days after the end of the month in which the mineral was produced or within thirty days of realization of the receipts. The mining authority is empowered to inspect and examine books in order to ascertain the quantity of minerals produced.

ENVIRONMENTAL REGULATIONS [49]

Controls aimed at safeguarding and protecting the environment from mining activity are exercised at two levels. First, statutory obligations have been placed on mining authorities to weigh environmental impact issues prior to the issuance of exploration and prospecting licenses and mining leases. The second calls for land management and rehabilitation measures during the course of mining operations and upon their completion.

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[47] Hunt, supra, note 31, at 35.

[48] Mining Regulations, reg. 86 (W. Austl.) (a copy is attached).

[49] Based on G. Bates, Environmental Law in Australia, ch. 6 (2d ed. 1986).

Environmental impact

There has been a recent trend in requiring mining authorities to undertake consultation and assess environmental issues prior to a decision to allow mining activity.

The South Wales Mining Act 1973, §117 directs the minister of mining or the Governor of the state to take into account the need to conserve and protect the flora, fauna, and scenic and archeological attractions of the area where mining is to be undertaken. To assist the mining authority in making a decision, the section authorizes the conduct of environmental studies. When a license or lease is issued, conditions may be placed to ensure the conservation and protection of the above mentioned environmental features. Similar provisions are found in the New South Coal Mining Act of 1973.

In the Northern Territory, mining wardens may request an environmental study of proposed mining.[50] The study may address issues of potential benefits and adverse effects, safeguards and environmental management proposals, and the availability of feasible alternatives. In recommending the grant or denial of a mineral lease, the warden must include his opinion on any conditions that will ensure the greatest protection to the environment reasonably consistent with the type of mining to be carried out.

Sections 30(2), 34(6), 41 and 52(4) of the Mining Act of 1971 of South Australia require that the natural beauty of a proposed mining area, the flora and fauna and any features of geographical, historic or architectural interest should be taken into account prior to the grant of permission for any mining activity.

Under a 1983 amendment to §7(4) of the Mines Act 1958 of Victoria, the following land may be exempted from mining operations:

> (a) land that is of such environmental importance that mining and prospecting should not be carried out
> (b) where the environment would be wholly or partially destroyed or detrimentally or irreversibly affected
> (c) where the environment is unusually sensitive and ought to be protected or preserved in the public interest, and
> (d) land that is of architectural importance or is a site which is of social, cultural or religious significance to Aboriginal people.

In Tasmania the general statute on environment protection authorizes the Director of Environmental Control to recommend the inclusion of certain conditions in mining leases that are considered desirable or necessary to prevent pollution.[51]

The Mining Act 1978 of Western Australia is specifically made subject to the Environmental Protection Act 1986 and any conflict between the two statutes is to be resolved in favor of the latter. Environmental protection measures are also inserted in the "ratified agreements" used in Western Australia. Thus, under the Tailings Treatment (Kalgoorlie) Agreement Act 1988, steps outlining the environmental measures to be taken are included in the agreement.[52]

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[50] Mining Act 1980, §58(6) & (7) (N.T.).

[51] Environment Protection Act 1973, §12 (Tasm.).

Rehabilitation of land

Land management and rehabilitation controls specific to mining operations have been given a legislative base in recent years. Previously, the clearance of land for mining went largely unchecked and only limited administrative directions were given on restoration as part of the conditions of a mining lease.

Under the Mining Act 1973 of New South Wales, the mines department may insert conditions in licenses aimed at the rehabilitation of the land mines. These conditions may require "the reinstatement, levelling, regrassing, reforesting and contouring of any part of the mining area that may have been damaged, or deleteriously affected by mining operations."[53]

In the Northern Territory the law requires notification of any intention to substantially disturb the surface of land and seeks adherence to any directions imposed for the protection of the environment.[54] Mining leases are granted subject to taking advice regarding the regeneration of vegetation. Sections 28 and 29 of the Mining Act 1958 of Queensland impose a statutory condition into mining leases requiring the rehabilitation, resoiling and restoration of land.

Some jurisdictions also employ rehabilitation bonds for ensuring compliance with the measures required. In Victoria the amount of the bonds is set to meet the costs of rehabilitation.[55] A recent review in Victoria noted that pre-estimates of the costs of rehabilitation may be inaccurate and should be revised.[56] The review also recommends the drawing up of objective guidelines specifying the rehabilitation work to be done. If the cost of the work carried out by the state is in excess of the security lodged, the excess may be recovered as a debt from the lessor.

The Mining Act 1971, §62 of South Australia also requires bonds and §63 establishes an Extractive Areas Rehabilitation Fund. The Fund receives all the amounts received as royalty, which may be used for the rehabilitation of land and for research into improving mining techniques which will reduce environmental damage.

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[52] Schedule, cl. 9.

[53] Mining Act 1973, §119(1) (N.S.W.).

[54] Mining Act 1980, §24(e) & §45(b) (N.T.).

[55] Mines Act 1958, §17(9)(b) (Vict.).

[56] Bradley, "A Fresh Approach to Mining in Victoria," 62 Law Institute Journal 959, 960 (1988).

MISCELLANEOUS

Surrender

A mining tenement may be compulsorily or voluntarily surrendered. In Western Australia at the end of the third year of the five-year term of an exploration license, fifty percent of the area must be relinquished.[57] At the end of the fourth year, a further fifty percent of the remainder must also be relinquished. The area surrendered becomes available to another person for the purpose of marking out and/or for making application for another mining tenement.

If a tenement is partially surrendered, the remainder must constitute a single area. The holder remains liable for the rent, fees, royalty, etc., payable prior to the surrender.

Exemption from expenditure

An exemption from the expenditure conditions in a mining tenement may be given after an open hearing in a warden's court. Any person may file an objection against the exemption application. Exemption may be granted on the following grounds:

(a) where the title is in dispute
(b) time is needed to plan exploration, to raise capital or to erect plant and machinery
(c) the ground is unsuitable for mining, and
(d) the mineral deposit is presently uneconomical.[58]

FOREIGN OWNERSHIP

Australia thrives on foreign capital invested in its mining industry, fifty percent of which is foreign owned.[59] However, there are some restrictions applicable on the level of foreign investment. Investments in new mining businesses are scrutinized to ensure

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[57] Mining Act 1978, §65(1) (W. Austl.).

[58] Id. §102.

[59] Business International, Investing Licensing & Trading, March 1, 1989.

Australian equity participation and control, and to safeguard Australia's national interest.[60] The acquisition of an interest in an existing mining interest is also examined under the Foreign Takeovers Act 1975.

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[60] Id.

CANADA

SUMMARY

Within Canada's ten provinces, mining operations are primarily governed by provincial laws and regulations that are generally quite dissimilar from one another. In the Yukon and Northwest Territories, mining operations are almost exclusively governed by far more uniform federal laws and regulations. The following report focuses on the relevant legislation Parliament has adopted for the Northwest Territories and the relevant orders in council various federal departments have fashioned for this sparsely populated region that was brought into Confederation in 1870. Comprising a single political entity that is over one-third as large as all of Canada, the Northwest Territories are known to be rich in many metals and are thought to contain extremely valuable quantities of many other minerals. However, frigid weather, icy conditions, and a lack of supplies and manpower have all greatly retarded the economic development of Canada's far north.

The Canada Mining Regulations provide for the granting of prospectors licenses, exclusive exploration permits, and renewable twenty-one year development leases. This statutory instrument also sets out rules for the staking of claims, the returning of surrendered lands to their natural state, and the payment of royalties based upon the value of an active mine's output.

The Canada Mining Regulations also allow the Minister of Indian Affairs and Northern Development to take steps to prevent mining activities from upsetting the delicate ecological balances of the Northwest Territories. Nevertheless, the primary source of environmental protection rules for this region is the Territorial Land Use Regulations. This order in council effectively empowers the government to require environmental impact statements of persons and corporations who intend to operate a mine on Crown lands. Other sources of applicable legislation are the Northern Inland Waters Act and the Fisheries Act.

Direct acquisitions of control of Canadian mining companies having assets worth more than five million dollars have been reviewable by the Investment Canada Agency (formerly the Foreign Investment Review Agency), since 1973. However, as of January 1, 1989, proposed takeovers of such corporations by investors of the United States are only reviewable if the Canadian business has assets worth more than fifty million dollars. By 1992, this threshold for reviewing investments by United States citizens and corporations will climb to one hundred and fifty million dollars.

EXPLORATION AND DEVELOPMENT

Crown Lands

Crown lands account for over ninety percent of Canada's entire land mass. [61] These unalienated properties are formally owned by Her Majesty either in right of the federal government or in right of one of the country's ten provincial legislatures. The federal government holds all Crown lands in the Northwest Territories and the Yukon as well as all submarine territories in Canada's offshore areas.[62] The provincial legislatures hold all Crown lands within the provinces that were not originally retained by the federal government or later conveyed to the federal government.[63]

Federal and Provincial Jurisdiction

Since 1982, Canada's Constitution has provided that:

> 92A. (1) In each province, the legislature may exclusively make laws in relation to
>
> > (a) exploration for non-renewable natural resources in the province; [and]
> >
> > (b) development, conservation and management of non-renewable natural resources and forestry resources in the province, including laws in relation to the rate of primary production therefrom;
> >
> > * * * *
>
> (4) In each province, the legislature may make laws in relation to the raising of money by any mode or system of taxation in respect of
>
> > (a) non-renewable natural resources and forestry resources in the province and the primary production therefrom, and
> >
> > (b) sites and facilities in the province for the generation of electrical energy and the production therefrom,

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[61] Canada Year Book 1980-81, at 27 (1980). Less than five percent of all Crown lands have been leased to mining companies and prospectors.

[62] Canada claims sovereignty over the entire Arctic Archipelago north of its continuous land mass. The United States does not recognize Canada's claim to sovereignty over what it considers to be international waters.

[63] Most of the territory set aside for the national park service consists of federal Crown land located within a province.

> whether or not such production is exported in whole or in part from the province, but such laws may not authorize or provide for taxation that differentiates between production exported to another part of Canada and production not exported from the province. [64]

However, long before these constitutional powers were confirmed and enlarged, the legislatures of all of the provinces enacted laws and regulations to control the exploration and development of mines and minerals on their Crown lands[65] and the federal government enacted separate laws and regulations to control the exploration and development of mines and minerals in the Yukon and Northwest Territories.[66] As these laws and regulations generally differ from one another in many significant respects,[67] this report will concentrate on the enactments the federal government has created for the Northwest Territories.

The Northwest Territories

The Northwest Territories are composed of all of Canada's lands and submarine areas north of the 60th parallel, except the Yukon Territory and the northern tips of Quebec and the Labrador portion of Newfoundland. This region is more than one-third the size of all of Canada, but it has a population of less than fifty-five thousand persons.[68] In 1986, the value of all types of minerals produced in the Northwest Territories was reported to be approximately 656 million dollars.[69] Over ninety-five percent of this figure was attributed to sales of zinc, lead, gold, silver, and other metals. The Northwest Territories are considered to have great mineral potential[70] and have seen a slow, but fairly steady growth in exploration activities.

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[64] Constitution Act, 1867, 30 & 31 Vict. ch. 3, §92, as amended by the Canada Act, 1982, ch. 11, Sched. B, §50 (U.K.).

[65] See, the Reference Guide to Mining Legislation in Canada (1985).

[66] Yukon Quartz Mining Act, R.S.C. ch. Y-4 (1985); Yukon Placer Mining Act, R.S.C. ch. Y-3 (1985); Territorial Lands Act, R.S.C. ch. T-7 (1985); and the Canada Mining Regulations, Can. Consol. Regs., ch. 1516 (1978), as amended.

[67] See supra, note 65.

[68] Annuaire du Canada 1988, at 2-16 (1988). All dollars are Canadian.

[69] Id. at 10-19.

[70] Id. at 1-6.

Canada Mining Regulations

The rules respecting the exploration and development of mines and minerals in the Northwest Territories are primarily contained in the Canada Mining Regulations.[71] This order in council defines the term "mine" to include any work designed to be used in removing minerals from the earth and defines the term "mineral" to include precious and base metals, but not coal, petroleum, hydrocarbons, or such materials as stone, gypsum, shale, and gravel.[72] Thus, even though they do not employ the term, the Canada Mining Regulations essentially cover all types of "hard rock" mining.

Exploration

The Canada Mining Regulations allow all holders of an exploration license to prospect for minerals and locate claims on Crown lands that are not: 1) part of a national park; 2) used as a cemetery; 3) covered by a valid claim or exclusive exploration permit; 4) already leased; or 5) placed off limits by the Minister of Defense or by other regulations.[73] Prospecting without such a license is prohibited, but any person above the age of eighteen or any corporation entitled to carry on business in a Canadian province or territory can obtain an exploration license by paying a nominal fee.

Permits that give exclusive exploration rights to a large area are issued every January to individuals and corporations who undertake to spend the following amounts on exploratory work that is acceptable to the Department of Indian Affairs and Northern Development:

> (a) north of the 68th parallel of north latitude
>
> (i) during the first two-year work period, an amount determined by multiplying the number of acres in the permit area by $0.10;
>
> (ii) during the second two-year work period, an amount determined by multiplying the number of acres in the permit area by $0.20, and
>
> (iii) during the third one-year work period, an amount determined by multiplying the number of acres in the permit area by $0.40;
>
> (b) south of the 68th parallel of north latitude
>
> (i) during the first one-year work period, an amount determined by multiplying the number of acres in the permit area by $0.10;
>
> (ii) during the second one-year work period, an amount determined by multiplying the number of acres in the permit area by $0.20, and
>
> (iii) during the third one-year work period, an amount determined by multiplying the number of acres in the permit area by $0.40. [74]

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[71] Can. Consol. Regs., ch. 1516 (1978), as amended.

[72] Id. § 2.

[73] Id. §8.

[74] Id. §31.

Exclusive exploration permits are available for a nominal fee and are valid for three years when they cover an area south of the 68th parallel or for five years when they cover an area north of the 68th parallel.[75]

Claims

The Canada Mining Regulations allow for the registering of claims by both holders of prospecting licenses and holders of exclusive exploration permits. The rules respecting the proper staking of claims are quite detailed and must be complied with in order for a registered claim to be valid.[76] Claims must be registered within sixty days of being located, but the holder of a recorded claim has thirty days from the tenth anniversary of its registration to apply for a lease of the property it is located upon.[77] As a general rule, claims may not exceed 2,582.5 acres. However, grouping is allowed to the extent that two adjacent claims that do not exceed 5,165 acres may be registered in one year.

Leases

A lease authorizes its holder to remove or sell minerals from a claim in excess of a gross value of $100,000 per annum for purposes other than testing. A lease will normally be granted if: 1) title is not disputed; 2) the required amount of representation work has been done; 3) a survey has been filed; and 4) rent for the first year has been paid. The initial term of a lease is twenty-one years, but it may be renewed if certain conditions are fulfilled.[78] A lease may be cancelled if the rent due is not paid within sixty days of the receipt of a notice from the Minister of Indian Affairs and Northern Development. The current rental fee is one dollar per acre per year.[79]

ROYALTIES

The Canada Mining Regulations provide that annual royalties shall be paid to the federal government on the value of the output of a mine located on Crown land in the Northwest Territories in accordance with the following schedule:

> (a) that part of the value of the output of the mine exceeding $10,000 but not exceeding $1 million, three per cent;
>
> (b) that part of the value of the output of the mine exceeding $1 million dollars but not exceeding $5 million, five percent;

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[75] Id. §29.

[76] An exception is made for persons who make good faith efforts to comply with these requirements. Id. §17.

[77] Id. §24.

[78] Id. §59.

[79] Id. Sched. I.

(c) that part of the value of the output of the mine exceeding $5 million but not exceeding $10 million, six per cent; and

(d) where the value of the output of the mine exceeds $10 million, a proportional increase of one per cent for each additional $5 million in excess of the $10 million but not exceeding, in any case, 12 per cent.[80]

Any mine that commences production after 1977 does not have to pay royalties on its production for the first thirty-six months that it is in operation.[81]

The value of the output of a mine for a fiscal year is the actual or imputed[82] value of the output minus allowable deductions. Section 65(8) of the Canada Mining Regulations states that the following types of expenditures may generally be deducted in computing the value of a mine's output:

(1) transportation charges;
(2) smelting and refining costs;
(3) operation expenses and maintenance costs;
(4) exploration and development costs incurred during a tax year;
(5) general and indirect expenses;
(6) a depreciation allowance of up to fifteen percent per year;
(7) preproduction costs; and
(8) if the ore, mineral or mineral bearing substance or any part thereof is not sold in the year but is treated by the operator of the mine within the Territories, and annual processing allowance equal to the lesser of
  (i) eight per cent of the original cost to the operator of the mine of the assets in the Territories used in such processing, including machinery, equipment and plant; and
  (ii) 65 per cent of the value of the output of the mine as determined under this section before deducting this allowance.[83]

Deductions are not generally permitted on account of, inter alia:
(1) capital costs that cannot be depreciated;
(2) depletion;
(3) elected officials' salaries;
(4) director's fees and travelling expenses;
(5) shareholders' reports and meetings;
(6) interest, taxes, and royalties; and

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[80] Id. §65.

[81] Id.

[82] The Department of Indian Affairs and Northern Development is authorized to establish the value of the output of a mine where it has no actual market value.

[83] Id.

(7) legal and accounting expenses. [84]

The Canada Mining Regulations require the owner or operator of every new mine to notify the government within ten days of beginning to remove ore or minerals from a site and to keep detailed records of all shipments. This order in council also authorizes the Mining Recorder to enter any mining property to gather information respecting its output "at any time."[85]

Provincial Royalties

The royalties that owners or operators of mines must pay to provincial governments vary considerably throughout Canada. In some provinces, royalties are not imposed on many types of metals and other "hard rock" minerals, but in several other ones, maximum royalties of between thirty and thirty-five percent on all profits or outputs are collected. Thus, no general rules can be given respecting provincial royalties.

PROTECTION OF THE ENVIRONMENT

Introduction

The Federal Government of Canada has long been intent on ensuring that economic development in the far north does not cause severe or avoidable damage to its very fragile environment. This longstanding concern has resulted in the adoption of a patchwork of laws, regulations, and policies that are not as detailed or demanding as their counterparts in the United States, but that nevertheless give various governmental agencies sweeping powers to compel owners and operators of mines to take steps to protect the natural state of the Northwest Territories.

The Canada Mining Regulations

Even though they were never intended to be a major source of the Federal Government's environmental protection laws, the Canada Mining Regulations contain a section that reads as follows:

> Where the holder of a recorded claim, the owner, operator, lessee or manager of a mine or any employee or agent of any such person discharges or causes to be discharged from his claim or from any mining operation thereon any substance that, in the opinion of the Minister, is or is likely to be harmful to humans, animals or vegetation, the Minister may, by order in writing, require that person
>
> > (a) to treat the substance before it is discharged so that it is not discharged in a form harmful to humans, animals or vegetation;

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[84] Id.

[85] Id. §69.

> (b) to limit the discharge of the substance in such manner as the Minister may order; or
>
> (c) to cease all operations causing such discharge. [86]

The authority conferred upon the Minister of Indian Affairs and Northern Development by this provision is not only close to being completely unfettered, but it is also buttressed by another provision that gives him or her the largely unqualified power to attach terms and conditions to leases of Crown land in the Northern Territories.[87] Therefore, the opportunities for seeking judicial review of a Minister's decision to take action to prevent environmental damage under the Canada Mining Regulations would appear to be extremely limited.

The Territorial Land Use Regulations

The Territorial Land Use Regulations state that no person may carry on any unauthorized work or undertaking on territorial lands that involves more than minimal uses of: 1) explosives; 2) public roads by large vehicles; 3) power driven machinery for drilling deep into the earth; 4) campsites; 5) petroleum storage facilities; 6) self-propelled earth movers; 7) power driven machines for clearing land of vegetation; or 8) levelling or snowploughing trails.[88] Since it would be virtually impossible to operate a mine in the Northwest Territories without engaging in a least one of the types of activities mentioned in this provision, the Territorial Land Regulations effectively require all owners or operators of mines to obtain a permit before commencing operations. Class A permits are generally required of large installations and Class B permits are generally required for exploratory undertakings and small or temporary facilities.[89]

Territorial Land Use permits are granted by the official Engineer appointed by the Minister of Indian Affairs and Northern Development. This individual is authorized to attach to any permit he or she grants terms and conditions respecting, among other matters: 1) the use and disposal of any chemicals or toxic materials; 2) the protection of wildlife and fisheries; and 3) the protection of objects and places of ecological value.[90] Although the Engineer is not required to ask for the production of an environmental assessment, the government-supported policy of recent holders of this office has been to request applicants for a permit to supply an impact statement.[91] The comprehensiveness of these assessments and the terms and conditions that have been attached to permits are matters that have usually been the subject of negotiations. This procedure seems to have worked smoothly as it has been reported that no application for a Territorial Land Use permit has ever been discontinued following initial rejection.[92]

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[86] Id. §73.

[87] Id. §61.

[88] XVIII Can. Consol. Regs., ch. 1524, §§8-9 (1978).

[89] The fees for both of these types of permits are nominal. Id. Sched.

[90] Id. §31.

[91] 6 American Law of Mining, para. 216.05[1] (1989).

In addition to establishing a licensing system, the Territorial Land Use Regulations require persons who have completed a land use operation to "restore the permit area as nearly as possible to the same condition as it was prior to the commencement of the land use operation."[93] To help ensure compliance with this provision, the Engineer may require a mine to deposit a security deposit of up to $100,000.[94] There have been proposals to raise this limit.[95]

The Northern Inland Waters Act

Under the Northern Inland Waters Act, the owner or operator of a mine must obtain a license from the Northern Territories Water Board before he or she may cause harmful wastes to be released so that they will enter any of the country's inland waters.[96] Terms and conditions can be attached to these licenses in the same discretionary fashion as they can be inserted in a Territorial Land Use permit.

Fisheries Act

Metal Mining Liquid Effluent Regulations[97] have been issued under the authority of the federal Fisheries Act.[98] This order in council declares arsenic, copper, lead, nickel, zinc, and radium 226 to be "deleterious substances" and establishes unauthorized concentrations for these minerals.[99] The Metal Mining Liquid Effluent Regulations also establish authorized PH levels and prescribe testing schedules.[100]

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[92] Id.

[93] XVIII Can. Consol. Regs., ch. 1524, §18 (1978).

[94] XVIII Can. Consol. Regs., ch. 1524, §36 (1978).

[95] Supra, note 91, at para. 216.05[2].

[96] Northern Inland Waters Act, R.S.C. ch. N-25, §7 (1985).

[97] VII Can. Consol. Regs. ch. 819 (1978), as amended.

[98] Fisheries Act, R.S.C. ch. F-14 (1985).

[99] VII Can. Consol. Regs. ch. 819, §4 (1978), as amended.

[100] Id. Sched.

RESTRICTIONS ON FOREIGN INVESTMENTS

Until January 1, 1989, the Investment Canada Act provided that all acquisitions of Canadian-owned businesses having assets worth in excess of five million dollars by foreign individuals and foreign-owned corporations were subject to approval by the Investment Canada Agency.[101] Since that date, however, this statute has been qualified with respect to investors from the United States. As a result of the conclusion of the United States-Canada Free Trade Agreement, the Investment Canada Act was amended to provide that the only takeovers by United States citizens and United States corporations that will be reviewable are: 1) takeovers of a firm in a "cultural" industry; 2) direct takeovers of a firm having assets worth in excess of twenty-five million dollars during 1989, fifty million current dollars in 1990, one hundred million current dollars in 1991, and one hundred and fifty million current Canadian dollars in 1992 and thereafter; and 3) indirect takeovers of firms having assets worth in excess of one hundred million dollars in 1989, two hundred and fifty million current dollars in 1990, and five hundred million current dollars in 1991.[102] After 1991, an indirect takeover of a Canadian business that is not a "cultural" industry will not be reviewable.

Neither the Investment Canada Act nor the United States-Canada Free Trade Agreement make special provisions for the acquisition of mines or minerals. However, the Investment Canada Act does contain two qualifying provisions that may be particularly applicable to foreign investments in the mining sector. The first of these exempts from the review process undertakings that are not capable of generating revenue or that are not carried on in anticipation of profit.[103] This rule generally allows foreign investors to acquire mineral properties which have not been developed to the point that they can be put into production over a short term regardless of their value. The other provision of the Investment Canada Act that may be particularly relevant to the mining industry is one that was designed to prevent parties from trying to avoid the review process by acquiring a division or part of a Canadian business. Section 31 of the

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[101] Investment Canada Act, R.S.C. ch. 28, §14 (1st Supp. 1985).

[102] Canada-United States Free Trade Implementation Act, 1988 Can. Stat., ch. 65. This exception does not apply to investments in uranium.

[103] Investment Canada Act, R.S.C. ch. 28, para. 3 (1st Supp. 1985) and supra note 91, at para. 211.03[2][a].

Investment Canada Act provides that "[a] part of a business that is capable of being carried on as a separate business is a Canadian business if the business of which it is a Canadian business."[104] This section would seem to empower the Investment Canada Agency to disallow the sale of a mine or mining division if its assets are worth a sum that is sufficient to render the proposed transaction reviewable.[105]

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[104] Id. §31.

[105] See, Foreign Investment in Canada, para. 15,036 (P-H 1989).

SOUTH AFRICA

SUMMARY

Exploration and Development

In South Africa, the State's policy has always been to encourage the exploitation of its mineral resources by private parties. The Mining Rights Act of 1967 and the Precious Stones Act of 1964 govern prospecting and mining of hard rock minerals on all types of lands, e.g., State land, alienated State land, and private land. This study, however, will present the provisions of the above laws governing only State lands.[106] The Minister of Mineral and Energy Affairs is empowered to control and administer all mining operations. Any white person or persons of eighteen years of age or over or a corporation the controlling interest of which is held by white persons with adequate financial and technical resources may acquire permission to prospect or mine on State lands. The prospecting and mining rights may be transferred with the permission of proper authorities.

Revenues

By law, there is a fixed fee at two rands for each prospecting permit and its renewal. The rent for each prospecting lease is determined by the minister. As for mining leases, the Minister follows the recommendation of the Mining Lease Board in determining the State's share of profits, royalties or other considerations. The State's share of proceeds of any precious stones found in the course of prospecting is determined by the State president based on the recommendation of the Mining Lease Board and by law the State's share of the profits from precious stones recovered in the course of mining operations is three-fifths of the profits.

Environmental Laws

The Mining Rights Act, Mines and Works Act, Water Act, and Atmospheric Pollution Prevention Act contain provisions pertaining to protection of the environment which are applicable to mining operations.

Foreign Investments

Mining laws do not impose any special restrictions on the mining operations of foreign investors.

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[106] State land is the land which is owned by the State and over which the State is also the holder of the rights to all minerals; alienated State land is the land which is privately owned or held by a leasee and in the title deeds or lease of which there is a reservation to the State of the right to all minerals. Private land is the land over which the State is not the holder of the right to the minerals. On such land, however, the right to prospect or mine must be obtained from the State, except for base minerals.

EXPLORATION AND DEVELOPMENT

In South Africa, State policy has always been to encourage the exploitation of its mineral resources by private parties while keeping under its control the mining operations and the use of the surface in connection with these activities.

The principal laws governing prospecting and mining of minerals are the Precious Stones Act and Mining Rights Act.[107] These acts provide the security of prospecting and mining rights and allow an attractive return on capital in spite of the State's substantial share of profits. The Mining Rights Act provides the principles for prospecting and mining rights. The provisions of the Precious Stones Act are based on the principles of the Mining Rights Act, discussion of which will also explain in general the principles of the Precious Stones Act.

The Minister of Minerals and Energy is responsible for the application of the provisions of the above acts. A number of officials appointed by the Minister, i.e., government mining engineers, the director of the geological survey, mining commissioners, and inspectors, help the Minister to perform the duties of the Ministry.[108] The Minister also consults and follows the recommendations of the Mining Lease Board, which is established under section 5 of the Mining Rights Act.

Prospecting Permits

No person is allowed to prospect [109] on State land without a prospecting permit or lease. Permits for base minerals and precious metals may be acquired from the Mining Commissioner. The commissioner may issue prospecting permits for State land that is open to public prospecting to a natural person who is white and eighteen years of age or older, a group of persons or a corporation the controlling interest of which is held by white persons. However, a colored person or a corporation with controlling interest held by colored persons may be issued prospecting permits for State land if the land is in the province of Good Hope.

Applications for prospecting permits should include the following, the full name of the applicant/applicants, if the applicant is a corporate body, its full registered name, the name, number, if any, and situation of the land, whether the applicant proposes to prospect for precious metals or base minerals or both, and any other information requested by the commissioner to ascertain whether the applicant is qualified to obtain a permit.

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[107] Act No. 73 of 1964 and Act No. 20 of 1967 in 21 [107]Statutes of the Republic of South Africa Classified and Annotated from 1910, at 493-581 and 756-977, respectively (Pretoria, 1985)(hereafter S.R.S.A.).

[108] Mining Rights Act, §§ 4-5.

[109] Prospecting is defined as "...intentionally searching for precious metals, base minerals or natural oil by means which disturb the surface of the earth, and includes all excavating necessary for the purpose, whether by underground or open working or otherwise as well as boring and work necessary for or incidental to such searching but does not include mining." Id., §1. Aerial survey and many of the modern surface geological methods of prospecting do not disturb the surface of the earth. Consequently, search by such methods may be conducted without a prospecting permit or lease.

Prospecting permits may be issued for a period not exceeding twelve months and may be renewed for the same period. A fee of two rands must be paid for each permit and its renewal.[110]

The holder of prospecting permits is entitled for each permit to stake out on the State land for which he has obtained the permits an area up to six hundred thirty meters square, as far as possible, in rectangular shape. A permit holder cannot stake more than ten prospecting areas in one magistrate district. Staking must be reported to the mining commissioner within one month and a plan of the area staked out must be submitted at the same time.

So long as the holder of a prospecting permit complies with the regulations applying to the demarcation of prospecting areas and prospects to the satisfaction of the commissioner, he has the exclusive right of prospecting within such area during the life of his permit. If the above conditions are not complied with within a month after a written notice is given by the commissioner, the holder of the prospecting permit may forfeit his right to the prospecting area to which the notice relates.[111]

The right to the prospecting area may be transferred with the written consent of the holder of such prospecting area when the mining commissioner, at his discretion, endorses the relevant prospecting permit.[112]

The Minister of Mineral and Energy Affairs may withdraw any State land from public prospecting by giving notice in the Government Gazette of the Republic. Such withdrawal cannot affect the right of any person to prospect on any prospecting area which he already lawfully holds.[113]

Prospecting Leases

Where the State land is not open to public prospecting, the Minister, after calling for tenders for a prospecting lease for precious metals or base minerals by giving notice in the Government Gazette and one or more newspapers in the area, may grant a lease to the tenderer who has shown that his financial resources are adequate for proper prospecting or the arrangement he has made to obtain capital for such prospecting is satisfactory. Without calling for tenders, the Minister may also grant such a prospecting lease to any person with financial resources who applies for it. The Minister determines the rent and other conditions of the lease. The holder of the prospecting lease must submit a sketch plan of the leased area to the Mining Commissioner within two months or within a period the commissioner may allow.[114] Prospecting leases may be transferred with the approval of the Minister.[115]

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[110] Id., §§7 & 9.

[111] Id., §8.

[112] Id., §9.

[113] Id., §10.

Mining Leases

A prospecting permit or lease holder may apply to the Mining Commissioner for a mining lease over the prospecting area he holds. The commissioner may ask the applicant to furnish:

(i) the mineralization of the area in respect of which the lease is required;
(ii) the scheme according to which the applicant proposes to mine;
(iii) the applicant's financial resources or the arrangements whereby he proposes to obtain capital for mining;
(iv) the share of profits, royalty or other consideration which he offers to pay to the state in consideration of the lease; and
(v) any other matter connected with the proposed lease.[116]

If the minister is satisfied that there are reasonable grounds for believing that the precious metal or base mineral is available in workable quantities in or on the land over which the applicant is seeking a lease, and after consultation with the Mining Lease Board, he finds that the scheme according to which the applicant proposes to carry on mining operations and his financial resources are satisfactory, he may grant the lease. After negotiating with the applicant, the minister determines the terms and conditions of the lease based on the recommendations of the Board. The Minister may request the Board to amend its recommendations. The Board may modify or confirm its recommendation, which may only be set aside or modified by the House of Assembly. The resolution of the House shall be deemed to be a recommendation of the Board.

Whatever the special terms and conditions that are recommended for a specific lease by the Board, all leases must contain the description of the leased area, and require that the leased area must be worked to the satisfaction of the minister. Books, plans, and records must also be kept to his satisfaction and must be open to inspection by the person authorized by him. In addition to taxes, payment of a share of profits, royalty or other considerations derived from working of the leased area must be made to the State.

The applicant must be notified of the Minister's decision concerning the lease. If the lease is awarded, the applicant must submit to the Mining Commissioner within six months a diagram of the area to be leased. In the event of non-compliance, the applicant shall be deemed to have abandoned his right to the lease.

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[114] Id., §13.

[115] Id., §23.

[116] Id.

Mining leases may continue until the precious metals or base minerals which are subject of the lease are exhausted or until the end of the period prescribed by the lease, unless the lease is abandoned by the lessee or cancelled by the Minister.

The lease holder who wishes to abandon his lease may do so by giving notice to the Mining Commissioner. Those who employ five hundred or more persons must give such notice at least three months in advance.

After giving written notice, the minister may cancel a mining lease,

> (i) if the Mining Commissioner has demanded payment of rent...and such rent is not paid within three months after the date of demand;
> (ii) in the event of non-payment as and when due of the share of profits, royalty or other consideration payable to the state under the lease;
> (iii) if the holder of the lease fails to carry out
> and observe any other provision of the lease; or
> (iv) if the holder of the lease fails to comply with
> any award relating to the lease made under the provisions of this Act.[117]

The lease, however, cannot be cancelled if the holder complies with the requirements of the notice, gives an acceptable reason for failure to comply with the relevant provisions of the lease, or submits the reasonableness of the Minister's requirements to arbitration.

A holder of a mining lease may transfer wholly or in part his rights and obligations under the lease with the approval of the Minister.[118]

REVENUES

In South Africa, a considerable amount of the State's revenues depends on mining activities. The Mining Rights Act, in principle, does not provide fixed rates for prospecting and mining leases. The legislature, taking into consideration that the expense, risk, and expectation of profits vary from one mineral to another and from area to area, has established a flexible system by leaving to the Minister of Mineral and Energy Affairs and the Mining Lease Board the decision of what share of profits, royalties, or other considerations must be paid to the State in consideration of each lease so that the amount of the payments to be made by each lease holder can be based on the expense, risk, and profit involved as much as possible to encourage the exploitation of all minerals in every area. One of the exceptions to the general rule is prospecting permits.

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[117] Id., §26(9)(f).

[118] Id., §26(8).

The act provides for a fixed fee of two rands for each prospecting permit and its renewal, but all other prospecting revenues are determined by the Minister, i.e., rent of prospecting leases and royalties or other considerations from prospecting operations if minerals recovered during the course of prospecting are removed by the prospector with the permission of the Minister.[119]

As for Mining leases, the Minister must follow the recommendations of the Mining Lease Board in determining the State's share of profits, royalties or other considerations. If the mining lease provides for the payment of a share of profits, the State's share must be determined after a capital allowance is deducted. The Commissioner for Inland Revenue calculates and determines the share of profits due to the State in like manner as the taxable income derived from mining operations. Objections and appeals against the decision of the commissioner can be made under the rules of income tax laws as well as the recovery of the State's share of profits.[120]

The Precious Stones Act provides different rules from the Mining Rights Act for the determination of the State's share of profits. From time to time, the State president may make regulations based on the recommendation of the Mining Lease Board prescribing the State's share of the proceeds of any precious stones found in the course of prospecting operations and the time and manner of payment of such shares. The regulations may prescribe different shares for different areas and may contain measures to provide safe custody and disposal of the stones discovered to ensure the payment of the State's share.[121] As for the precious stones recovered in the course of mining operations, by law[122] the State receives three-fifths of the profits.

ENVIRONMENTAL LAWS

As a result of the legislature's increasing concern for the protection of the environment from the effects of the pollution caused by mining activities, several laws, i.e., the Mining Rights Act, Mines and Works Act, Water Act, and Atmospheric Pollution Prevention Act, have imposed more restrictive rules and tightened the control of mining operations.

The Mining Rights Act prohibits the use of surface and water for prospecting and mining operations without permission of the Mining Commissioner, who may grant permission only under special conditions prescribed by him and designed to prevent or control pollution.

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[119] Id., §21.

[120] Id., §26.

[121] Precious Stones Act, §9.

[122] Id., §70.

The Mines and Works Act[123] was mainly designed to protect mining employees from the hazards of mining operations. Regulations,[124] however, made in terms of section 12 of the Act contain detailed provisions restricting storing and dumping solid or liquid waste in the course of mining operations and making rehabilitation of the surface an integral part of such operations as much as possible.

Section 21 of the Water Act[125] requires any person using water for industrial purposes, including mining "to purify or otherwise treat the water so used and any effluent produced by or resulting from such use, in accordance with"[126] regulations made by the Minister of Water Affairs.

The Minister may also authorize any person carrying on mining operations to discharge waste water, effluent, or waste in an unpurified state, specifying the steps to be taken in order to prevent the pollution of public or private water.

Under section 27(1) of the Atmospheric Pollution Prevention Act,[127] the Minister of Health and Welfare may declare any area to be a dust control area. Within such areas those who have prospecting or mining rights must adopt the best practicable means to prevent dust caused by mining operations from becoming a nuisance.

Mine owners are also responsible for taking necessary steps to prevent the pollution of the atmosphere after a mine is closed. Thus:

> [W]henever the Government Mining Engineer is of the opinion that having regard to the known and disclosed ore reserves of any mine, that mine is likely to cease mining operations within a period of five years, he shall in writing advise the Minister of Mineral and Energy Affairs and the owner of that mine accordingly and forward a copy of such advice to the minister.[128]

After receiving the Government Mining Engineer's notice, the owner of such mine cannot sell any assets of that mine without the permission of the Minister of Mineral and Energy Affairs or without taking adequate steps to prevent the pollution of the atmosphere to the satisfaction of the Chief Air Pollution Control Officer.

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[123] Id., Act No. 27 of 1956.

[124] Regulation No. 537 in Government Gazette No. 6892 of March 21, 1980.

[125] Act No. 54 of 1956, 30 S.R.S.A., 1201-1401.

[126] Id., at 229.

[127] Act No. 45 of 1965, 23 S.R.S.A., 391-411(1).

[128] Id., §32.

FOREIGN INVESTMENT

South Africa welcomes foreign investment and its laws encourage it. Consequently, mining laws do not impose any special restrictions on mining operations of foreign investors.

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Mr. SNOW. May I address that?

Senator BUMPERS. Yes.

Mr. SNOW. That has to do with the other element of discovery risk, and that is the opportunity to make a discovery. This country has been intensively prospected. Those countries are relatively virgin. So that is a tradeoff on risk.

Senator BUMPERS. Their requirements are so much more stringent than ours, and heavy royalties are required in every one of those countries.

Mr. SNOW. Not in the Yukon, sir.

Senator BUMPERS. In Canada, the revenues to the government are based on value of output with a maximum of 12 percent. Maybe the Yukon is exempt.

Mr. MILLS. Senator, my name is Brad Mills. I work for a Canadian mining company called Echo Bay Mines. In that capacity I can tell you that Echo Bay has received substantial subsidies from the Canadian Government to place mines into production in northwest territories. The company spent about $100 million placing a large gold mine in production. The Canadian Government provided about $10 million in subsidies in terms of assistance to the company to do that and very substantial individual tax breaks to the company to encourage the development of that mine.

It is rather typical of the Canadian Government. They provide a great many deferred taxes and individual subsidies for power and road construction that is not available in the United States.

Senator BUMPERS. Thank you.

Senator McClure.

Senator MCCLURE. Thank you very much, Mr. Chairman. I know we have other witnesses to hear as well, and I want to get to them.

I understand that major mining companies are not disturbed by royalty provisions. I am as a public policy matter. I am concerned because anything you do that inhibits the capacity for economic growth in our country has an adverse effect upon the Nation as a whole; maybe not upon an individual company but upon the Nation as a whole.

It raised the cost of commodities to consumers and stifles the opportunity for reasonable investment and return on investment. The hardrock mining industry in particular deals with the question of marginal economics, the question of whether or not a deposit is minable.

I understand that the environmental community is hung on the horns of a dilemma on that question because, one, is you do not want any more disturbance of the environment than is necessary, than is justified by other public policy goals.

The other side is we do not want to waste natural assets. This is one of those places where if you protect the environment against the disturbance on a marginal deposit and that is a goal and an opportunity, then you have also locked up a marginal deposit in the sense that it will never be used. That is the waste of an asset, the way I see it.

So it seems to me we have a balancing of two very legitimate environmental objectives, and if we raise the price without reason, then we have certainly wasted assets. We have rendered ore bodies uneconomic; therefore, they will never be utilized, and we will have to go look somewhere else for ore bodies or several other places for ore bodies.

I listened to you, Mr. McCloskey, as you were going through a list of things that you wanted done, that you think need to be done. I really asked myself as I was listening to the list of things you wanted done, are they not being addressed by other laws?

With the exception of the patent question, which I think reasonable minds ought to be able to find an accommodation on, an adjustment that would be reasonable and workable, with the exception of the royalty question, and there we are dealing with economics, I have never believed the idea that the Federal Government is an entity that is a property owner as a private property owner is that must maximize economic return or even seek economic return on very use of public resource. We do not do that, as a matter of fact, on very many public resources.

Most of our highways are not toll roads. I guess we could have that, but I do not believe that the Federal Government as a property owner has the same mandate or the same justification for the use of public resources as does the private property owner, although we may differ on that.

I understand the concern that you have about the government not being able to say no, I do not want you to mine there. That is another question that can be addressed very directly.

When it comes to the question of acid mine drainage, fugitive dust, any one of a dozen other concerns that you listed—and I think it was about a dozen you listed—they are all addressed by several existing Federal and State laws. The question of whether or not there is a permit, for instance, before exploration, before any discovery, if there is any substantial surface disturbance such a permit is required today under existing law and regulation.

So I am not quite certain that I know what the objective is other than tightening up on our existing laws and practices.

Mr. Hocker or Mr. McCloskey?

Mr. McCloskey. I will be glad to answer, Mr. Chairman.

Those other laws really are put in a very difficult position with respect to their enforceability if the initial decision is made to mine in a place that is burdened with many environmental difficulties.

Senator McClure. That is the question of whether or not you can say no.

Mr. McCloskey. Exactly; but our view is that that is the pivotal event which then makes it very difficult to adequately enforce many of the other laws, the pollution laws, and NEPA itself really does not come into play because the Federal agencies deny that they are making any decision. They say they have no decision of any substance to make on that.

Senator McClure. All right, let us take NEPA and set it aside. The Clean Water Act, is it waived?

Mr. McCloskey. The pollution laws ostensibly apply. My information is that they are very weakly enforced because——

Senator McClure. All right, do you want stronger enforcement?

Mr. McCloskey [continuing]. Because of this perception that they are caught with an unmanageable situation in many cases.

Senator McClure. And the Clean Air Act?

Mr. McCloskey. The same there.

Senator McCLURE. Fugitive dust is still fugitive dust.

Mr. McCLOSKEY. We have had terrible difficulties getting any real implementation of the fugitive dust——

Senator McCLURE. So it is implementation; it is not because there is no law that covers it?

Mr. McCLOSKEY. That is certainly a big part of it; but again, we think that the problems arise in many cases out of mines being in locations which are difficult to control for environmental reasons physically because of their location and nature.

Senator McCLURE. Mr. Hocker?

Mr. HOCKER. Senator, first I would like to say I appreciate the sincerity of this line of questioning. I take it very well and appreciate it.

We are here as a body of concern because of our direct field experience with the way this law is being applied. By "this law" I mean the 1872 Mining Law but as overlain by the the laws you have mentioned.

The field reality and the reality of the citizens groups that have been calling us for advice and concern, the Minerals Policy Center, and that deal with the Sierra Club and other organizations, is that when you are faced with a proposal to mine and you are dealing with a responsible Federal agency, the Federal officials will say we recognize the concerns that you are raising, we think these may be problems, but because it is a Mining Law activity there is really not much we can do except impose maybe a few conditions if they will accept the conditions.

There are several reasons why it works this way. The patenting provision is one shadow on this, but I do not think that removing patenting will alleviate the problem.

Assume for the sake of argument again that we have a case where there is a valid discovery. There is a valuable mineral deposit there; otherwise, you would not have a serious mining proposal. When the BLM, for example, reviews a mining proposal right now, it is always looking over their shoulders that if they do not like the proposal, the company can take the claim to patent and go ahead anyway.

Senator McCLURE. They still are subject to the environment law.

Mr. HOCKER. Not if it has become private property.

Senator McCLURE. Well, if it is private property, they are still covered by——

Mr. HOCKER. Of course, they are subject to the Clean Water Act and the Clean Air Act; but nonetheless, as you look at the field administration by the officials, that is clearly a problem.

The second thing is that they view the 1872 Mining Law, and the expressions you will hear in the mining community press agree, as giving them a fundamental right to mine and the other laws as simply nibbling at the edges. Their operation may be conditioned or modified in some way by those laws, but if it comes to actually denying approval to proceed with the project, it does not go to that extent, and that is the way the law is interpreted by the agencies.

The law may in theory or in law school text be interpreted differently. No court has done so yet to my knowledge.

Senator McCLURE. Well, certainly whatever right they have, vested or not—and I almost use that term inadvertently—whatever right is created under the mining statutes cannot in any way evade the positive proscriptions of other Federal and State statutes. If they have to meet environmental tests, they have to meet environmental tests whether it is a Federal mining claim or whether it is a private property.

I have been told by any number of mining people that they do not feel they have been nibbled by these other statutes except in the same context that they have been nibbled to death by ducks. They do not regard the application of the other statutes as being so irrelevant or insubstantial that it does not affect their operations.

So there may be a difference of perception.

Mr. Delcour, would you say that you believe that you are not covered adequately by the administration of environmental laws by Federal agencies?

Mr. DELCOUR. I know of no environmental law that does not apply to mining. Senator Bumpers mentioned SMCRA but, of course, it is not a law of general application. It is a law that is applied to a single industry by its own terms.

I do not honestly understand Mr. McCloskey's assertion that because the miner under the Mining Law can in fact gain title or ownership to an ore body what that has gotten him essentially is the right to go into business like anyone in a thousand other businesses so long as he can do so in conformance with the laws of the land. If he has patented the claim, then not only the laws of the land but all of the local zoning and land use laws go with it.

I am not aware of any difference in application of water quality laws. Indeed, because of the disproportionate burden water quality laws place on dischargers of metals into water, I suspect the mining industry is disproportionately burdened by water pollution laws.

Fugitive dust, you mentioned, typically is regulated under State laws through State implementation plans. Some states regulate it more precisely than other states, but that would become a function of what state you are in, not a function of what industry you are in.

So no, I cannot really think of any relief the mining industry has under the Nation's environmental laws.

Senator MCCLURE. Mr. Snow, you mentioned a moment ago the difficulty of maintaining the kind of operation, the kind of business you and your wife are now engaged in and the difficulties you would have if, indeed, costs of that operation are increased.

The Chairman, in effect, was pushing you on particular parts of the charges, no one of which by itself, I suspect, is sufficient to cause you to go broke or get out of the business.

Mr. SNOW. That is true. The added charges are money that we do not have to do the exploration with, however. We have a limited purse. If we spend the money on registration fees, we are unable to spend it on geochemical sampling and analyses.

Senator MCCLURE. So that it is an expense that substitutes for other work?

Mr. SNOW. Indeed.

Senator MCCLURE. I do not want to burden this discussion, either, with respect to the bonding requirement, but typically bonding requirements are much more difficult for small organizations than large; is that correct?

Mr. **Snow**. Very much so, sir.

Senator **McClure**. What you do as you increase the stringency of bonding requirements for reclamation is to drive the small operator out of the business.

Mr. Hocker?

Mr. **Hocker**. Senator, we recognize the problems that bonding poses, and it is not at least from our organization's point of view an attempt to create some artificial, insurmountable hurdle here.

I think the idea of a menu of financial security options which Mr. Delcour mentioned earlier is something that would be supported certainly by us and I think by most environmental groups.

The objective, though, is to ensure that the public at large is not bearing an unfair risk and burden——

Senator **McClure**. And neither you do not want to transfer the burden from the bad operators to the good operators.

Mr. **Hocker**. Well, that gets into the technicalities of bonding, and the House had an extensive and very informative hearing on that not long ago.

At the risk of exposing the GAO to more calamity, they have concluded in their recent report on unreclaimed hardrock sites that there are approximately, I believe, 50,000 acres of hardrock sites outstanding and unreclaimed since the application of the FLPMA regulations in 1981.

So under all currently——

Senator **Bumpers**. Where did you get that figure, Mr. Hocker?

Mr. **Hocker**. The GAO report. It is cited in my testimony, Senator.

Senator **Bumpers**. Well, you had asked that question, I think, Mr. Delcour.

Senator **McClure**. I will look at that report, and if it is as bad as the recent one I will advise you to junk that one, too. I would hope that it is better than that recent one.

Incidentally, we are always burdened by the difficulty of looking at our current situation, what we see before us right now and separating it in its historical context from the events that did occur before and no longer do occur. So I will be looking very carefully at that report with respect to when these occurrences happened.

My state has many scenically grand areas, and one that interests the tourists most is the Yankee Fork. The Yankee Fork is an old placer mining area which was left unreclaimed and, therefore, people drive miles to see. If that area had been reclaimed, there would be far fewer people that would visit than they do today. That is not just to say that every area ought to be left unreclaimed.

We do not require a bond for somebody who builds a highway, that when the highway is no longer there that it is reclaimed. We do not require of the railroads that they reclaim abandoned railroad lines and put it back into their approximate original contour.

We do not, for example, require the builder of a structure downtown in Washington, DC to post a bond that when that building becomes run down they tear it down and clear the site. Maybe we should, but we have not yet done it.

Again, we seem to have a different yardstick by which we measure what happens with respect to natural resource management, and I am not certain that I know in my own mind why it is we do that.

The City of Denver is going to build a new airport if they can ever get their act together. I do not know quite what happens to the old airport. Maybe the builders of the new have to reclaim the old and turn it back to the cheat grass dry land that existed there before they covered it with concrete.

I am not sure where we have as a society focused our attention on natural resource industries and said you and almost you alone must march to a different drummer. We have heard some of the discussion here today about making certain that the BLM gets all of their costs covered or recovered from the mining industry occasioned by the BLM's operations with the mining industry. We do not require that with respect to the National Park Service. We certainly do not require it with the wilderness users. I know we do not require it in wild and scenic rivers.

I am not sure why it is that we single out one group of users of the public lands and say you and you alone must pay the full cost of your presence as though you have no societal value.

I am not unmindful of the desire we have to internalize costs in operation so that future generations do not pay those costs. I am fully in accord with that general thrust; but again, the building of a building downtown imposes great costs on the future, and if we were to analogize in quite the same way that we do with respect to past mining operations to current operations and towards the future, we would go up to any one of the deteriorated central cities, take pictures of the slums and the tenements and the rundown buildings and say, see, that is what I mean you, builder of the new building, must avoid, and so we will charge you today to make certain that you do not pass onto the next generation a rundown subway system in New York City.

I am not exactly certain how I get in my own mind to saying the mining industry is different and, therefore, must pay these costs if we as a society are not willing also to say to other users that they, too, must pay the costs.

Mr. Chairman, I am sorry I got off on that tact because I know you are in a hurry to continue this hearing, and I want to expedite that. I will work with you in trying to find ways in which we can accomplish objectives in which we find agreement, just as we did in the Mineral Leasing Act. I think there are some, but there are also probably some upon which we will remain in disagreement. I hope we can out of that find at least those areas where you can improve the administration of the public lands to meet legitimate public objectives.

Thank you.

[Subsequent to the hearing Mr. Snow submitted the following:]

Barranca
Resources

June 16, 1989

The Honorable Dale Bumpers
United States Senate
Dirkson Office Building, Room 229
Washington, D. C. 20510

Re: Legislative hearing, Bill S. 1126, June 7, 1989

Dear Senator Bumpers:

These remarks are intended to amplify and clarify comments I volunteered in response to your question about the danger of cyanide used in the processing of low-grade gold ores. You wondered how it could be lethal and yet not a threat to the environment. Please accept this for inclusion in the hearing record.

Cyanide (CN^-) is made up of carbon (C) and nitrogen (N), two common elements in the earth and atmosphere. It occurs naturally. The bitter taste in seeds from apricot pits owes to the presence of cyanide compounds. "Tobacco smoke is probably the most important daily source of cyanide exposure to the general public. Cigarette smoke contains 1,600 parts per million of cyanide."[1]

The principal lethal gases of cyanide are cyanogen (C_2N_2) and hydrogen cyanide (HCN), also known as "hydrocyanic acid." This is the compound I had difficulty correctly articulating and believe I called "hydrocyanic gas."[2]

The cyanide of commerce is sodium cyanide (NaCN). Its principal uses are for extracting gold and silver from ores, electroplating, case hardening of steel, and for fumigation. Its utility in the extraction of precious metals comes from cyanide's attraction for gold and silver. When sodium cyanide (NaCN) is dissolved in water it separates into two ions, the cyanide ion (CN^-) and the sodium ion (Na^+). Gold (Au), for example, combines to form a gold cyanide ($Au(CN)_2^-$) which is insoluble. So long as the solution is

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[1] NSF, 1983, Cyanide from mineral processing: Proceedings of a workshop sponsored by NSF, USBM, & industry, Salt Lake City, Utah, p.4-15.

[2] It becomes a gas at 78°F.

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kept alkaline, with pH of 11 or greater, absolutely no hydrogen cyanide (HCN) can form.

Cyanide concentrations in precious metal leach solutions are in the range of 0.3 to 610 parts per million.[3] Compare these values with the concentrations in cigarette smoke noted above.

Solutions used in the leaching of low-grade gold ores contain free cyanide ions (CN^-). If water containing these ions is ingested by a warm blooded animal, the acid in the animal's stomach combines with the cyanide ion (CN^-) to form hydrogen cyanide (HCN) which is toxic. The industry is currently taking precautions to ward off birds and other wildlife.

Because the toxicity of cyanide is well known, treatment of cyanide wastes is standard practice. ~~It is~~ widely known that the movement of cyanide in soil is usually quite limited because it either forms insoluble complexes with trace metals or is metabolized by various mircoorganisms. "Numerous studies have shown that bacterial, fungal, and algal species can convert cyanide to carbon dioxide (CO_2) and ammonia (NH_4) which is then [harmlessly] released to the environment."[4] This means that in low concentrations, such as might possibly escape to the environment, cyanide becomes lunch instead of being toxic. When cyanide ion (CN^-) is exposed to sunlight, it rapidly oxidizes to form nitrous oxide (NO_2) and carbon dioxide (CO_2), both atmospheric gases. Hydrogen cyanide (HCN) is oxidized to form carbon dioxide (CO_2) and ammonium ion (NH_3^-), both common atmospheric gases.

I hope I have shown why, in the context of your questions, cyanide in this use is simply not a threat to the environment.

Thank you for this opportunity to clarify my remarks.

Very truly yours,

G. Snow

Geoffrey G. Snow, Ph.D.

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[3] NSF, 1983, Cyanide from mineral processing: Proceedings of a workshop sponsored by NSF, USBM, & industry, Salt Lake City, Utah, table 1.2.

[4] NSF, 1983, Cyanide from mineral processing: Proceedings of a workshop sponsored by NSF, USBM, & industry, Salt Lake City, Utah, p.4-5.

Senator **Bumpers**. Senator Domenici.

STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

Senator **Domenici**. Mr. Chairman, first let me thank you. I am not a member of this subcommittee, and I obviously do not want to delay matters but I do have a New Mexican who will be appearing on behalf of our mining association, Mr. Charles Roybal, the Executive Director of the New Mexico Mining Association. I wanted to, with your permission, say to him that he is welcome and I am delighted that he is here.

From my standpoint, just to make an early statement before your activities move up to the full committee, I want to say that it has been my impression that this law of 1872 is very old. Looking at where America was and where we have been and how far we have come in terms of our mineral development and mining, I think it just has to have served us well.

Obviously, from time to time we have to look at it, and perhaps there are some areas we ought to repair and reform. A few come to mind; obviously, just little pieces like patent fees which may be inadequate to bear the costs, and perhaps something ought to be done about acquiring land for uses other than mining through some circuitous route of using this Mining Law.

But I just want to go on record early on that I do not think the problems we have, be they environmental, be they attitudinal on the part of our bureaucracy or whatever, justify scrapping this law; and certainly I do not think it justifies substituting a whole unknown, untried system for the American mining industry, large and small.

I have gone through in my state the rise and fall of the uranium industry three times in my short life. I have watched copper go from the most vibrant industry in the state to almost dead and through a lot of good things, including mining industry doing some exciting things. They are back alive. They might survive. They are doing well. I watched potash go from the most important potash mining in all of this United States to almost a state of demise, and they are back alive, but we had to work at it.

So I think we have to be awful careful. We surely ought not take an axe to this law. We ought to take a very sharp knife and do some pruning and improving.

Our future is still tied to mines and mineral extraction in this country, and I do not think we have learned enough about new things to say we do not need that. Frankly, I think the public domain has to remain open, other than where currently precluded, to the exploration of excited people so long as we are not going to jeopardize and violate our other environmental laws.

We have no way of measuring what that vitality brings to this system for people, individuals and companies large and small, to know that they can go look and that they can perhaps find. Frankly, that kind of thing is frowned upon by much of society today, and yet we want more production out of everybody.

So I come here to compliment the Chairman and ranking member for having the hearings and to put my two cents in from the standpoint of the law and its service to or people and our country and the desire not to throw the baby out with the bath water.

Thank you very much, Mr. Chairman.

Senator **Bumpers**. Thank you, Senator Domenici.

Gentlemen, thank all of you for being here with us today.

Our next panel will be the mining dialogue: Mr. Putnam Livermore, President, Public Resource Associates in California; Mr. Lynn Greenwalt, Vice President for International Affairs and Special Assistant to the President of the National Wildlife Federation; and Mr. Russell Babcock, Director of Exploration for British Petroleum.

We will take a five-minute recess while you gentlemen are taking your seats.

[A brief recess was taken.]

Senator **Bumpers**. The committee will come to order.

Mr. Livermore, your name is the first one on my list, so please proceed.

STATEMENT OF PUTNAM LIVERMORE, PRESIDENT, PUBLIC RESOURCE ASSOCIATES

Mr. **Livermore**. Thank you, Senator.

Senator **Bumpers**. Just a minute. We do not yet have order in the committee room, Mr. Livermore.

Please proceed.

Mr. **Livermore**. I am Putnam Livermore, an attorney and President of Public Resource Associates, Senator. Public Resource Associates is an independent nonprofit organization that studies issues relating to the American land and its natural resources with particular emphasis on problems arising in the west. We would like to emphasize research, public education and consensus building on issues.

The principals of Public Resource Associates have had a long background in law, hardrock mining and land conservation, but we represent no mining company or environmental organization, just ourselves.

We want to thank you for this opportunity to be here today and testify. We have had a lot of divergent views on this 1872 Mining Law, and our group has emphasized its consensus.

A little more than a year ago we became involved in a dialogue group on the law, and among the members of the dialogue group were Russell Babcock, to my left, a representative of a mining company, and to my right, Lynn Greenwalt, a representative of an environmental organization.

The challenge as we see it, Senator, is to develop a legal framework that preserves miner's incentives to explore and mine in a manner that is compatible with contemporary standards for multiple use land management, environmental protection and economic efficiency.

While seeking the correct balance of values, we have to realize we are not writing on a clean slate here. This is an old law and has served the country well. We think the basic structure of the law should be retained and perhaps updated and improved.

Any effort to change the law, we think, should be guided by a commitment to assure continuity of practice for both administrators and miners, stability in the industry and the smoothest possible transition for all concerned.

In our dialogue efforts, we have identified the nine salient issues, some of which have been mentioned here today, and our discussions revolved around these nine issues. They are: self-initiation; claim location; security of tenure; diligence; scope of patent; fees and charges; surface management and environmental protection; land use planning; and the grandfathering of rights.

Through our discussion of these issues, we have come to agree on a key set of principles around which we believe consensus can be developed. They are:

One, retain the self-initiated claim location system;

Two, establish secure tenure by eliminating the discovery requirement for unpatented claims and make the requirements for patent reflect actual industry concepts of economic feasibility;

Three, replace the present surface and mineral patent with a patent of the minerals only;

Four, impose a true diligence requirement as the price of tenure;

Five, assure environmental protection, including reclamation, bonding and improved land planning; and

Finally, provide for fair payment for the use of the land.

We continue to be optimistic about our prospects for reaching agreement in our dialogue group.

As to the bill before us, at the outset I have to say that it would be difficult for this bill in its present form—and I emphasize in its present form—to be a basis for the consensus we have been seeking.

The mining community, looking at the bill, is likely to think it is extremely severe from their point of view. To illustrate, a modest holding of, say, 10 claims, which is about the minimum for a feasible operation these days and thus the relevant unit for comparison with the single claim of 1872, would cost about $12,000 in the first year in fees and annual labor or in-lieu payments as compared to $1,150 under current rules.

This level of expenditure would likely prove prohibitive for the small miner in most cases. Large operators for their part will tell you that an 8 percent royalty on top of existing severance taxes and payments to claimholders would stifle the incentive to mine in this high cost business.

In addition, the bill's treatment of existing claims is harsh. Its terms may make sense for the unique circumstances of oil shale where the less disruptive transition is called for with respect to hardrock.

The bill does have many positive features, however. It is built on the basic framework of the self-initiated claim which from our point of view is essential for any proposal to be workable. It makes diligence the basis of tenure and substitutes a mineral patent for the existing surface and mineral patent. It adopts the concept of a uniform claim located where possible by legal subdivision, which is a most useful change.

In addition, it provides sensibly for the use of ancillary lands for activities in support of development and production. We view this bill as one step in a long process which we hope will lead to a mining law which will work well for miners, land managers and the Nation far into the next century. Those of us involved in the dialogue that I have described will do all we can to help.

Thank you, Senator.

[The prepared statement of Mr. Livermore follows:]

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STATEMENT OF
THE PUBLIC RESOURCE ASSOCIATES
BEFORE
THE SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES,
101ST CONGRESS, FIRST SESSION
REGARDING
THE 1872 MINING LAW AND A BILL TO PROVIDE FOR THE DISPOSITION OF HARDROCK MINERALS ON FEDERAL LANDS, AND FOR OTHER PURPOSES

June 7, 1989

PUBLIC RESOURCE ASSOCIATES

Mr. Chairman, Members of the Committee:

Public Resource Associates is an independent nonprofit organization comprised of a small group of individuals engaged in research, public education and consensus-building on issues relating to the American land and its natural resources, with particular emphasis on the public lands of the West. We do not represent any mining company or any environmental organization or any other interested parties than ourselves. I am Putnam Livermore and I am President of Public Resource Associates. Thank you for the opportunity to share our perspective on the 1872 Mining Law and the bill under consideration.

It is national policy to encourage responsible mineral exploration and development on the public lands. Although the 1872 law has been amended several times, most recently by the terms of the Federal Land Policy and Management Act of 1976 (FLPMA), further changes could still be made to improve the way the law serves that policy. Beginning in modern times with the 1970 Report of the Public Land Law Review Commission and continuing through numerous studies, reports and the 1987 House of Representatives oversight hearing, a substantial record has already been built on the law's remaining shortcomings. The surface patent entitlement, the lack of a true diligence requirement, uncertain tenure and imperfect integration with environmental protection laws: these features, among others, have created, in varying degrees, problems for miners, land managers and the public at large. From a policy perspective, the fact that somewhere between 40 and 50% of the federal lands are closed to hardrock mining is particularly telling.

It is no secret, however, that the question of what to do about the 1872 Mining Law has been, since the first Public Land Commission looked into it in 1879, a persistently troublesome one. A divergence of interests within the mining industry--between small miner and big operator, explorationist and producer--coupled with increasing competing demands for our public lands--and the accompanying debate over how best to use and care for them--make the search for an answer as difficult as any public land issue has ever been.

The principals of Public Resource Associates have a background in law, hardrock mining and land conservation. We have talked to people on all sides of the issue, and believe, despite the difficulties, that ways to common ground can be found.

A little more than a year ago we became involved with a dialogue group consisting of representatives, including Russell Babcock, of six mining companies and representatives, including Lynn Greenwalt, from three of the country's largest environmental organizations--people who have not talked much to each other in the past. The premise of this dialogue was, and is, that the 1872 Mining Law can be modernized in ways that will benefit everybody with a legitimate interest in the outcome. The dialogue participants have been meeting over these past many months to educate each other as to their concerns and to work their way, in small, incremental steps, toward consensus. We are not there yet, and it is not a simple process. Environmentalists and miners cannot be expected to agree in every case on the relative social utility of mining versus land conservation, and this conflict of values is certainly an obstacle. But I think it is fair to say there is a sense among us that we have been making progress--a little more each time we meet.

The challenge, as we see it, is to develop a legal framework that preserves and strengthens a miner's incentives to explore and mine in a manner that is compatible with contemporary standards for multiple use land management, environmental protection and economic efficiency. While seeking the correct balance of incentives and controls, it is, however, necessary to bear in mind that we are not writing on a clean slate. This is a 117 year old land tenure law, one that is deeply rooted in the history and culture of the American West, and it involves a unique and intricate intermingling of public and private interests and rights, operating within a complex framework of federal and state law and regulation. We think the basic structure of the law should be retained and built upon. Any effort to change it should be guided by a commitment to assuring continuity of practice for both administrators and miners, stability in the industry and the smoothest possible transition for all concerned. We urge that you only change what you have to, and only make changes that will work in context.

In our dialogue, we have identified and examined what we think are the nine salient issues:

(1) self-initiation

(2) claim location

(3) security of tenure

(4) diligence

(5) scope of patent

(6) fees and charges

(7) surface management/environmental protection

(8) land use planning

(9) grandfathered rights

Through our discussion of these issues we have come to agree on a set of key principles around which we believe consensus might be developed. They are:

(1) retain the self-initiated claim location system;

(2) establish secure tenure by eliminating the discovery requirement for unpatented claims and make the requirements for patent reflect actual industry concepts of economic feasibility;

(3) replace the present surface and mineral patent with a patent to the minerals only;

(4) impose a true diligence requirement as the price of tenure;

(5) assure environmental protection, including reclamation, bonding and improved land planning; and

(6) provide for fair payment for the use of the land.

Principles are not enough, of course, and the details raise hard questions. Russ Babcock and Lynn Greenwalt will have a good deal to say about this. For now let me just say that we are working away at the details and continue to be optimistic about our prospects for reaching agreement.

I would like to comment now, briefly and selectively, on the bill you have before you. At the outset, I have to tell you, it would not be possible for us to use this bill, in its present form, as a basis for the consensus we have been seeking. The mining community, looking at the bill, is likely to think its intent is to punish rather than improve. The small miner, who plays an important if not well understood role in the exploration for and development of mineral resources, would be particularly hurt by the cumulative impact of the fees and diligence levels it would impose. To illustrate, a modest holding of, say, ten claims, which is about the minimum for a feasible operation these days and thus the relevant unit for comparison with the single claim of 1872, would cost $12,000 in the first year in fees and annual labor or in lieu payments as compared to $1,150 under current rules. This level of expenditures would likely prove prohibitive for the small miner in most cases. Large operators, for their part, will tell you that an 8% royalty, on top of existing severance taxes and payments to claim holders, would stifle the incentive to mine in this high-cost business. And by withdrawing more lands from location, the bill goes in exactly the opposite direction from what one would expect of a modernized mining law, one that is more fully integrated with contemporary standards for multiple use management and environmental protection.

In addition, the rights that adhere to a mining claim under the bill are hazy. If a plan of operations can be denied and a claim voided without clear, upfront standards to guide a land manager's determination, the right to explore and mine on the open public lands becomes illusory. Miners, increasingly, have come to anticipate the costs of environmental mitigation as costs of doing business. They understand that conditions in some areas will be more restrictive than others and accept the responsibility for compliance. But if they are to proceed with any measure of confidence, they should have the right to expect that there will be no outright prohibition of exploration or mining, except under very special circumstances, other than through the existing withdrawal procedures. As for the treatment of existing claims, the bill strikes us as unnecessarily punitive. Its terms may make sense for the unique circumstances of oil shale, but a less disruptive transition is called for with respect to hardrock.

The bill is not without its positive features, however, for which I wish to commend you. It is built upon the basic framework of a self-initiated claim location system, which, from the viewpoint of the Public Resource Associates, is essential for any proposal to be workable. It makes diligence the basis of tenure and substitutes a mineral patent for the existing surface and mineral patent, changes which would be substantial improvements to the existing law. It adopts the concept of a uniform claim, located, where possible, by legal subdivision, a most useful change. In addition, it provides sensibly for the use of ancillary lands for activities in support of development and production.

We view this bill as one step in a long process, which we hope will lead to a mining law that will work well for miners, land managers and the nation far into the next century. Those of us involved in the dialogue that I have described will do all we can to help.

Thank you.

Senator **Bumpers**. Thank you very much, Mr. Livermore.
Mr. Greenwalt.

STATEMENT OF LYNN A. GREENWALT, VICE PRESIDENT, NATIONAL WILDLIFE FEDERATION

Mr. **Greenwalt**. Thank you, Mr. Chairman. My name is Lynn Greenwalt. I am Vice President of the National Wildlife Federation, the Nation's largest nongovernmental conservation education organization with 5.8 million members and supporters and affiliate organizations in 51 states and territories.

I am very pleased to have this opportunity to discuss the legislation here and the continuing efforts that have been described by Mr. Livermore involving my organization and other conservation groups to work with elements of the mining community to bring more modern concepts to the Nation's basic mining law.

My written testimony recapitulates for the record the reasons conservationists are concerned about the 1872 law and its execution. As you have heard earlier, the mining industry has concerns as well, though they are not necessarily the same as ours, nor are their concerns viewed from the same perspective.

I would like to emphasize that my organization's fundamental concern is with the law and in the way the 1872 Act and subsequent land management legislation have been applied over time. We are not here to criticize the mining industry even though there are those miners and opportunists who take advantage of circumstances now and then. I suspect that can be said of conservationists, too.

The bill we are considering offers a way to address the concerns we all have. Clearly, it does not represent a consensus of the feelings of everyone potentially affected by it. For some, its mere presence in the legislative system is frightening. To others, it does not go far enough to satisfy perceived needs. It does touch all the bases in some way, and that is indeed welcome. We now have an instrument with which we can work to develop legislation representing the present day needs of miners and conservationists.

As has been mentioned earlier, representatives of a part of the mining industry have been meeting with conservationists to discuss ways to develop a better understanding of each other's concerns. I want to emphasize that because the illumination that has come through this group and the meetings we have had about each other's concerns has been extraordinarily important to me.

It has driven home to me personally and to the people of whom I have been asked to be a representative the importance of clearly understanding what really happens as opposed to what people think happens and the ways the statutes, the 1872 Act and subsequent ones, can be used effectively to create a situation in which we can all get to where we ought to be, which is vitally important. I find it, Mr. Chairman, increasingly important as I get older. I have less time left to make the mark, and I would kind of like to do that one of these days.

In any event, this dialogue group has been extraordinarily important to all of us, and I am indeed pleased to have been a part of it.

We have made a lot of progress in this arena, but there are many details that we have yet to resolve, just as your bill contains many details which will have to be considered carefully as the legislation moves along.

In brief, our continuing consultations have resulted in agreement in principle but not necessarily in the finest detail on several basic issues, the same ones we have heard reiterated all afternoon: retention of the concept of self-initiation; the idea of true diligence; a fair return; modern concepts of patenting; environmental protection including reclamation and this kind of thing; and the whole gamut of issues about which people are concerned. We have been discussing those.

These general issues are addressed in this bill, though the details of each of these considerations do not necessarily reflect the views of the parties involved in the dialogue group. This is to be expected and should not diminish the intensity of our deliberations, nor should it presume that your bill is not a helpful and useful starting point for future productive debate because the National Wildlife Federation at least believes it is.

I must observe, however, and I think this is a point that has been made a couple of times this afternoon, that changing the mining law of 1872 is important but it is not the whole answer. It is not the entire answer at all. Existing legislation and associated regulations offer ways to recognize and serve the interests of miners and conservationists.

There is a need to make sure that public land managers use the tools they have at hand—the law, the planning mechanisms and public participation—to do their jobs. Modern mining law used in concert with these tools, I believe, can fashion decisions about land uses which do keep faith with the principles of good land management.

The world has changed a lot since 1872 when the Mining Law was passed, and it is necessary to recognize that fact and the rules by which public lands are used. Change can offer positive opportunities for the mining industry, and it can be done in ways which accommodate environmental and conservation interests as fully as possible.

The legislation before us may not be what everyone wants, but it does provide the opportunity to solve problems for both groups and provide properly for the public interest. The National Wildlife Federation is prepared to continue to work with the mining interest on these problems because we believe resolution can be achieved.

We applaud the subcommittee's desire to review the mining statute and you, Mr. Chairman, for developing a measure which presents an opportunity to deal with this vital issue. Needless to say, my organization is prepared to help in every way we can. We are prepared to continue with the dialogue group, and we are prepared to work diligently to achieve the kind of resolution everybody wants.

Mr. Chairman, thank you for the opportunity to speak here.

[The prepared statement of Mr. Greenwalt follows:]

Working for the Nature of Tomorrow.

NATIONAL WILDLIFE FEDERATION

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STATEMENT OF

LYNN A. GREENWALT

VICE PRESIDENT

ON BEHALF OF THE

NATIONAL WILDLIFE FEDERATION

BEFORE THE

SENATE SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION

REGARDING THE

MINING LAW OF 1989

AND

REFORM OF THE 1872 MINING LAW

JUNE 7, 1989

Mr. Chairman and members of the Subcommittee, my name is Lynn Greenwalt and I am a Vice President of the National Wildlife Federation (NWF). On behalf of NWF, I want to thank this Subcommittee for this opportunity to present our views on the "Mining Law of 1989" and reform of the 1872 Mining Law generally.

NWF is the nation's largest conservation/education organization, with over 5.8 million members and supporters in 51 states and territories. We have a longstanding interest in the management of our nation's public lands and resources which stimulates our call for significant reforms in the 1872 Mining Law.

The need for reform of the 1872 Mining Law has been well-established for many years. It has become a vehicle for abuse of the public lands. It has resulted in the disposal of public lands for a fraction of their fair market value -- lands which the public often has to buy back at a premium. It has resulted in millions of acres of the public mineral estate being unavailable for mining because claims have been filed and the claimants have not done anything. It has needlessly created major obstacles to public land management. And finally, the law and its administration have allowed the public lands to be despoiled by unreclaimed mine sites.

Although NWF in the past supported legislation which would repeal the 1872 Mining Law and replace it with a leasing system, we now are willing to support the principle of "self-initiation" of locating hard rock minerals as long as there are other changes in the 1872 Law.

We believe that any reform of the Mining Law should:

1) incorporate explicit provisions for the protection of the environment, reclamation of mined lands, and adequate bonding of mining operations;
2) repeal the existing "patenting" provision of the 1872 law;
3) increase diligent development requirements; and
4) assure the public a fair return from mineral activities.

Senator Bumpers' bill addresses these issues, and we commend him and his staff for undertaking this bold and worthy initiative to resolve this decades-long controversy.

THE NEED FOR REFORM OF THE 1872 MINING LAW

Although I am not here to recite a list of problems with the 1872 law, I think it useful to set forth, for the record, a few of the the conclusions of a sampling from numerous reports and studies over the last two decades critical of the Mining Law:

Public Land Law Review Commission:

- The General Mining Law of 1872 has been abused, but even without that abuse, it has many deficiencies. Individuals whose primary interestis not mineral development and production have attempted, under the guise of that law, to obtain use of public lands for various other purposes. The 1872 law offers no means by which the government can effectively control environmental impacts. Other deficiencies include the fact that claims long since dormant remain as clouds-on-title, and land managers do not know where claims are located.

One-Third of our Nation's Land, June 1970.

Council on Environmental Quality:

- The Mining Law of 1872 ... remains an anachronism. The Law does promote private exploitation of the mineral wealth of the public land; indeed, that was the original and sole intent. Today, however, efficient and equitable management of public resources is more complex; it requires that mineral exploitation be considered an objective but not the objective. Other objectives which are not met under the present law are delineated in this report: multiple use of the public lands; environmental protection; a fair market return to the public; retention of a public ownership; efficient allocation of resources;

energy conservation; competition in the mineral industry; adequate information for public decision making. Hence, reform of the 1872 law is necessary and is long overdue.

Hard Rock Mining on the Public Land, 1977.

U.S. General Accounting Office:

- Contrary to its intended purpose the 1872 law is not effectively encouraging development of minerals on Federal land and had adversely affected management and use of the land.
- The Mining Law of 1872 has no provision for protecting or rehabilitating lands covered by mining claims or mineral patents.
- The 1872 law does not require payments to the Federal Government for minerals mined or for use of the lands. The amount charged for land conveyed to private owners under mineral patents -- $2.50 or $5.00 an acre -- is only nominal and bears no relationship to the land's fair market value.

Modernization of 1872 Mining Law Needed To Encourage Domestic Mineral Production, Protect the Environment, and Improve Public Land Management, July 1974.

- Reform of the mining law appears necessary to reverse adverse trends in exploration and to assure future availability of domestic mineral supplies.

Mining Law Reform and Balanced Resource Management, February 1979.

- Because BLM does not require its state offices to review mining claim data submitted by the claim holder at the time the claims are recorded, some offices are not invalidating claims which are located on federal lands after they have been withdrawn from mining. In addition, despite requirements for reclamation, some BLM lands are not being reclaimed, and BLM does not require most miners to post bonds covering the costs of reclamation.

Interior Should Ensure Against Abuses from Hard Rock Mining, March 1986.

- Our review of 20 patents issued since 1970 showed that the federal government received less than $4,500 for lands valued in 1988 at between $13.8 million and $47.9 million. Our review of 12 patent applications showed that, if all the land applied for is patented, the government will receive about $16,000 for land appraised in 1988 at between $14.4 million and $47.1 million.

General Accounting Office, Federal Land Management:The Mining Law of 1872 Needs Revision, March 1989

Bureau of Land Management

- California has approximately 139,000 mining claims registered on the public lands, and many squatters attempt to use these claims as a device to continue to reside "up in the hills." More often than not, BLM officials say, there is no attempt made to actually mine the land; rather, the mining claim becomes a facade for continued squatting or continued cultivation of marijuana. Many of these motions of performing work without attempting to develop the minerals.

Bureau of Land Management, California State Office, "Newsbeat," April 1986.

ENVIRONMENTAL PROTECTION, RECLAMATION, AND BONDING

One of the most significant defects of the 1872 law is the lack of explicit requirements for protection of the environment. Specific provisions which would place environmental protection requirements on mining operators and integrate mining operations with land-use decisions, to post bonds which will ensure compliance with such requirements, and to reclaim the land following mining operations should be added to the 1872 law.

The Congressional Research Service, in a report prepared at the request of Subcommittee Chairman Rahall, concluded:

> The federal non-coal mineral laws do not expressly require reclamation. Instead, reclamation requirements are imposed administratively, either in reliance on a generalized articulation of the public interest, or in reliance on other land management statutes that apply. The requirements stated in the regulations vary depending on the minerals and lands involved; the regulations are subject to administrative change since the requirements are not direct statutory requirements; there is considerable administrative discretion as to the requirements that are imposed in any particular instance; and it appears that the land use planning process of the BLM and the Forest Service are not clear as to how mineral development is to be taken into account in balancing other possible uses and resource values of particular lands.[1]

Of the various non-coal minerals, the hard rock minerals governed by the 1872 Mining Law have the weakest standard for protection of the environment.

As part of the Federal Land Policy and Management Act of 1976 (FLPMA), Congress provided the Secretary of the Interior with the first explicit authority to regulate mining activities under the 1872 Mining Law on public lands. Section 302(b) of FLPMA provides:

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[1] Congressional Research Service, Reclamation of Lands Following Non-Coal Surface Mining: A Legal Analysis, Pamela Baldwin, Legislative Attorney, American Law Division, March 10, 1986.

> In managing the public lands the Secretary shall, by regulation or otherwise, take any action necessary to prevent unnecessary or undue degradation of the lands. 43 U.S.C. 1732(b).

This provision of law provides the basis for the Bureau of Land Management's "3809" regulations (43 C.F.R. 3809), which establish standards for the operation of mining under the 1872 law. NWF believes that the 3809 regulations do not provide adequate protection to the environment.[2]

First, the regulations purport only to prevent "surface disturbance greater than what would normally result" when mineral excavation is undertaken. Id. Section 3809.0-5(k). They are not intended to prevent harm to scenic, wildlife, recreational, and other environmental values normally associated with mining operations. Mining claimants are specifically permitted to "preserve evidence of mineralization" even after complete reclamation. Id. Section 3809.1-3(d)(5), 3809.0-5(j). Second, the regulations do not apply at all to lands which have been patented, and are therefore no longer subject to federal control. The Department recognized that the regulations which it adopted, under the existing FLPMA standard:

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[2] The comparable regulations of the U.S. Forest Service suffer from the same general deficiencies.

> ...are not intended to eliminate all impacts. Therefore, enforcement of these regulations will not entirely eliminate the short or long-term impacts of mineral-related operations. For example, in some areas when the surface material is removed in an operation, production of timber and forage may be reduced or eliminated. Surface drainage, water quality, aesthetics, and wildlife habitat may also be affected.[3]

The fact is that given the "property right" status afforded mining claims, and the weak environmental protections offered by the 3809 regulations, the public land management agencies cannot protect sensitive resources. Despite the existence of valuable wildlife habitat or recreational resources, for example, neither the BLM nor the Forest Service can preserve effectively the resources once mining claims are staked and mining is commenced.

The lack of clear and explicit statutory authority for protection of the environment, reclamation of mined lands, and adequate bonding allows irresponsible mining operators to create the type of abuse which the General Accounting Office has identified in the reports cited above.

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[3] Bureau of Land Management, Final Environmental Impact Statement, Surface Management of Public Lands under the U.S. Mining Laws, 43 C.F.R. 3809, (August 1980), at 6-1.

PATENT REFORM

The National Wildlife Federation favors retention of the public lands in Federal ownership. This was the principle established in FLPMA, and we continue to support it. The 1872 Mining Law was enacted in an era during which the guiding principle of public land management was to "dispose" of public lands as fast as possible. Clearly, it is inconsistent with established policy, and the right to patent public land under the mining law is a major source of abuse and an obstacle to public land management.

While the Mining Law has not been the most significant source of public lands disposal, substantial acreage has been disposed of under this law. Roughly three million acres have been patented under the Mining Law, and today some 20 million acres remain under claim and subject to potential disposal.[4] As the Council on Environmental Quality noted, Congress has declared the policy of the United States that public lands be retained in Federal ownership. "No objective reason exists for mining to continue to be an exception to this rule."[5]

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[4] U.S. Department of the Interior, Bureau of Land Management, Public Land Statistics 1986, Table 46 indicates that at the end of fiscal year 1986 there were 1,214,515 claims of record. The average claim is typically 20 acres, for a total acreage under claim of 24,290,300 acres.

Few will argue that the $2.50 patenting fee approximates "fair market value" for land disposed under auspices of the Mining Law. A 1974 study conducted by the General Accounting Office, for example, examined 41 patents issued in Arizona and California. The GAO reported that the 3,833 acres patented under the 1872 law brought a total of $12,141 to the government. The "fair market value" of the acreage, however, was $1,144,191.00. The public had received only one percent of the "market value" of the land. Not surprisingly, the GAO concluded that "...large profits were being made on the sale of patented land."The fact that fair market value is not received for lands patented under the Mining Law is well known.[6] This kind of abuse continues to this day.[7]

Not only are individuals making profits from the sale of lands patented under the mining laws, but the public has found it necessary sometimes to purchase back such land. We find it ironic, at best, when as part of the designation of wild and scenic rivers, recreation areas, or parks, public funds are used to buy back mining claims.

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[5] Council on Environmental Quality, Hard Rock Mining on the Public Land, 1977, p. 30.

[6] U.S. General Accounting Office, Modernization of 1872 Mining Law Needed to Encourage Domestic Mineral Production, Protect the Environment, and Improve Public Land Management, July 25, 1974, p. 32.

[7] U.S. General Accounting Office, Federal Land Management: The Mining Law of 1872 Need Revision, GAO/RCED-89-72, March, 1989.

THE NEED FOR A DILIGENCE PROVISION IN THE MINING LAW

Holding a claim under the Mining Law carries with it significant private benefits. For example, claim holders have the right to "exclusive" use of the public lands. In return for these private benefits granted to mining claim holders, the lands are supposed to be mined productively.[8]

However, of the more than 1,200,000 recorded mining claims on the public lands, only a fraction is productive mining operations. For example, when the General Accounting Office examined 240 randomly selected mining claims, it found only one being mined and three showing evidence of having been mined.[9]

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[8] In Pine Grove Nevada Gold Min. Co v. Freeman, 63 Nev. 357, 171 P.2d 366 (1946), for example, the court states:

> The obligation of doing the annual assessment work is the obligation assumed by the locator of a mining claim, as a condition of his right to hold and develop the claim. The government desires the development of its mineral resources, and, instead of leasing the property and requiring a payment of rent, requires, as compensation for the right to hold and develop the property and extract the fruits of such development, that the claimant perform annual assessment work.

Although the Mining Law clearly intended for claim holders to pursue development of valuable mineral deposits actively, it contains no specific diligence language. The annual expenditure requirement of the law, set at $100 over 100 years ago, is so small it no longer serves this purpose.

The $100 annual assessment work requirement was intended, when established in 1872, to represent a significant expenditure of labor. In the late 1800's the average individual's yearly earning was $480, and the average wage was only 20 cents per hour.[10] At that time, $100 was roughly the value of labor which would be expended annually by one miner diligently working a claim in the summer months. Simply increasing the annual expenditure requirement to reflect current average labor rates would place the work requirement over $5,000.[11] Moreover, given the change in technology of mining, even for a small mining operation (there were no bulldozers in 1872), a greater increase in the expenditure requirement can be justified easily.

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[9] U.S. General Accounting Office, Modernization of the 1872 Mining Law Needed to Encourage Domestic Mineral Production, Protect the Environment, and Improve Public Land Management, July 25, 1974, p. 8.

[10] See "Mining Law and Multiple Use, Natural Resources Journal, April 1967, p. 248.

The annual assessment work requirement should recognize that a different level of expenditure is associated with exploration of land and the development and operation of a mine, as Senator Bumpers' bill recognizes. It should also be made clear that failure to perform annual assessment work will result in the mining claims being voided by operation of law, a requirement explicit in Sec. 204 (e)(2) of Senator Bumpers' bill.

FAIR RETURN

As the Subcommittee is well aware, perhaps the most controversial deficiency of the 1872 Law is the lack of any provision for the public to be compensated directly for minerals taken from the public lands. No rents are charged for the occupation of public lands for mineral purposes. The 1872 Law is alone among the statutes governing mineral development on the public lands in not requiring "fair market value" for commodities extracted for private benefit.

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[11] Department of Labor, Bureau of Labor Statistics, average 1981 weekly earnings for coal mining, metal mining and nonmetallic minerals is $421.78, and average weekly hours worked is 41.13. Therefore, resulting average hourly wage is $10.25.

We believe that any substantive reform of the 1872 Law should incorporate some provision for the public to be fairly compensated for the use of public lands for mineral activities.

STATUS OF EFFORTS TO ACHIEVE CONSENSUS ON MINING LAW REFORM

As Members of the Subcommittee may be aware, for the past year representatives of NWF, the Natural Resources Defense Council, and the National Audubon Society have met with representatives of several mining companies under auspices of the Public Resource Association to attempt to find a common basis to approach hard rock mining reform. Although we had hoped to achieve a consensus to present to Congress prior to the initiation of Congressional action on the issue, and have made substantial progress, we have not yet worked out all our differences. However, we have made substantial progress toward that goal, and I believe we have developed a basic appreciation for the needs and perspectives of each side. Mr. Livermore has summarized basic categories of issues we have agreed must be addressed in any meaningful reform legislation. I think it is worth broadly characterizing our perspective on several key elements of this process, I do so now, speaking only on behalf of NWF:

Preservation of the claim-location system within the framework of land use planning. The mining industry representatives have made clear their desire to preserve the principle of self-initiation, and find replacement of that principle with a discretionary leasing system completely unacceptable as antithetical to a healthy domestic hard rock minerals industry. We in turn have found it acceptable to preserve the basic tenets of the claim-location system, so long as it can be integrated into the modern land use planning programs of the federal land management agencies, and to the extent that this integration provides opportunities to protect important environmental values. We also believe the integration of the claim-location system into the land use planning programs of the Forest Service and BLM can enhance the mineral industry's desire for a degree of administrative certainty regarding the conditions and restrictions to be imposed on mineral activities on public lands, prior to the commitment of resources to a particular project. At the same time, it provides the environmental community with some assurance that environmentally sensitive lands and values will be identified and protected prior to mineral development commitments being made.

Environmental protection is a concept which arouses concern in the mining community. Miners like to know what the game rules are going to be and they prefer not to have too many surprises. The conservation community wants to be sure the environment is protected, but finds little comfort in the 1872 Mining Law, and not much more in the way some of the more modern land-management laws have been applied.

The result is a need to increase understanding and to continue the effort to reach an accord on the subject. For instance, conservationists would like to be assured that certain critical environmental areas are not subject to mining. These include habitats critical to the well-being of threatened or endangered species, most wetland and riparian areas, places of historic or archaeological importance, areas important as habitat for fish or wildlife, certain recreation or scenic areas and "areas of critical environmental concern."

Some of these areas, but certainly not all of them, probably should not be subject to mining activity in any circumstance. However, things are not always that simple. For instance, a place important as a concentration area for golden eagles during migration may not be unusual as wildlife habitat at any other time and carefully managed prospecting, development and mining activity may not be a problem, providing recognition is given to the seasonal needs of the migrating eagles.

An enlightened understanding of the values of the land and a willingness to look at ways to solve these problems often can lead to determinations that permit reasonable access to and use of land and its mineral resources. Such determinations are appropriately carried out under the auspices of the federal agencies' land use planning programs.

I believe there is basic agreement between the two sides on this general principle, i.e., preservation of the claim-location system within the framework of land use planning. However, these principles are less difficult to describe in theory than to articulate in a statute that will ensure their execution with the desired effect. Senator Bumpers' bill attempts to accomplish this task, and I believe is an approach worth refining and building upon.

Reclamation. Our discussions of post-mining land use issues, plus our review of a number of recent General Accounting Office reports on the subject of hard rock reclamation, have, I believe, led both the mining industry representatives and us to conclude that it is desirable to provide explicit statutory authority to the appropriate Secretary to require reclamation. I think that part of the reason the industry representatives we have discussed this with agree to this in principle is that: (a) with few exceptions most western states currently require reclamation of mined land; (b) both the Forest Service and BLM have developed regulations with respect to reclamation with which many responsible mining companies are comfortable; and (c) most responsible companies agree in principle with the idea of reclamation, so long as the specific requirements are not viewed as onerous burdens on the industry. The mining industry understands our view that, despite the fact that reclamation is already generally accepted by responsible mining companies, and that both the Forest Service and BLM have existing regulations on the books, the basic federal statutory framework for this basic concept is deficient. Therefore, we would like to see any mining law reform measure contain explicit reclamation authority, with guidance to the agencies regarding the types of issues to be addressed within the agencies' regulatory framework. Senator Bumpers' proposal does so in Sec. 301(b).

Patents to Minerals Only. Both NWF and the mining industry representatives agree that the current patenting system has outlived its usefulness. We both agree, moreover, that miners need some certainty of tenure to their claims. We agree basically it is desireable to reform the law to provide the opportunity to acquire a limited patent to the mineral only, with retention of the surface estate and leasable minerals to the government.

Sec. 203 of Senator Bumpers' proposal is based on the same basic premise - that patents should be limited to the hard rock minerals only.

Diligent Development. NWF and the mining industry representatives agree that a "true diligence" requirement is a necessity in any mining law reform. Our discussions have focused on developing a modernized and escalating annual work assessment requirement, incorporating the opportunity for payment in lieu of labor, with a "drop dead date" beyond which a claim must go to patent or be forfeited. This basic concept is incorporated into Senator Bumpers' proposal in Sec. 204. Disagreements exist, however, over the specific amount of work required, amount of payments in lieu of labor, and duration of exploratory activities prior to development or forfeiture.

Fair return. This is an area of continuing disagreement between ourselves and the industry representatives. The industry representatives maintain that taxes, employment opportunities, economic development and other indirect economic benefits of a mining venture, along with their proposal to levy a modest rent for the use of public lands, provide ample "fair returns" to the public for hard rock mining operations. We agree that mining is often a marginal undertaking, replete with risks of all kinds, subject to the vagaries of a world market, and plagued by the uncertainties attendant upon pursuing a resource that cannot be seen in detail, may not in fact even be present, and which a market adjustment may make worthless. However, these are circumstances which to one degree or another confront every business enterprise, and are currently present in the case of publicly-owned minerals subject to leasing under the terms of the Mineral Leasing Act. In the 120-year interval since the Mining Law was passed, public opinion about public resources has changed. Contemporary federal land management is based upon the fundamental concept of "fair market value," that is, public lands and the commodities derived from them are no longer to be disposed of free-of-charge. While this concept has not been applied perfectly, it does apply widely and is a principle that in some form must be extended to hard rock minerals.

In conclusion, I believe that many of the basic concepts contained in Senator Bumpers' proposal are ones which reform-minded members of the mining and conservation communities can agree upon. These include: preservation of self-initiation, true diligence, fair return, modernizing patenting requirements, and environmental protection. However, the specific provisions of the bill have come under severe criticism from the mining industry. Although much of that criticism comes from those who have no interest in reform, on the other hand many reform-minded members of the mining community are severely distressed by it as well. I have discussed some of these concerns with Mr. Livermore and Mr. Babcock, including the level of assessment work required,

required, the royalty provision, and yearly fees to name three. I understand these concerns. These and other issues are ongoing topics of discussion between us, and I believe that in the future we will be able to arrive at some alternative proposals. However, I do wish to commend Senator Bumpers for taking the initiative on this issue. We look forward to working with him, this Subcommittee, the House Subcommittee on Mining and Natural Resources, and reform-minded members of the mining and conservation communities to refine the concepts contained in this important proposal.

Senator **Bumpers**. Thank you very much, Mr. Greenwalt.

Mr. Babcock.

STATEMENT OF RUSSELL C. BABCOCK, DIRECTOR OF EXPLORATION, BRITISH PETROLEUM MINERALS AMERICA

Mr. **Babcock**. My name is Russell Babcock, and I am the Director of Exploration for BP Minerals America's Kennecott operation, Salt Lake City, Utah. As you know, Kennecott has been operating in the United States for over 80 years now. I am an exploration geologist, and I have had a long involvement with the public land issues, especially those that relate to the minerals industry.

I feel it is important to discuss the issues which are involved in mining law revision and have appreciated the opportunity to work with Put Livermore and Lynn Greenwalt and others in this dialogue group to see if it might be possible to find some common ground.

I am encouraged that all of us in the dialogue group are committed to self-initiation and to secure tenure for the miner. Having stated these principles, it is then important to ensure that the location system is clearcut and provides well-defined rights and that the tenure system gives the miner clear and unequivocal ownership of minerals and that rights of access and surface use are part of this tenure.

Activities under the Mining Law have been characterized as unregulated, but we have seen here today that that is not the case. The activities of the miners on the public lands are tightly regulated under Forest Service and BLM laws and regulations. The activities of the miners on all lands, private, State or Federal, are regulated by a larger body of State and Federal environmental law. There is no exception in these laws for the mining industry.

In the dialogue group we recognize this interrelationship. A concern that has developed for clear and perhaps stronger environmental control of mining activities appears in many cases to be related to those instances where responsibility has not been exercised in spite of adequate authority.

Nevertheless, there are problems in these areas, and we have been discussing them.

When protection of the environment and mining are in conflict, I am confident that site-specific solutions can be found in the challenges to find mechanisms which will lead us to the solution. For instance, the single act of creating a minerals-only patent might resolve most surface use problems by virtue of surface use remaining under Federal management authority, but such a patent would require strong and clear surface use rights to ensure the security of tenure of a miner.

In land use planning, the anticipation and prevention of conflicts is at issue. Can a mechanism be developed to plan ahead for mining impacts? If so and if miners and other users through the permitting process can find a balance and be held responsible for their activities, then perhaps the same mechanism can be used to open some currently withdrawn areas and reduce the need for future withdrawals.

Inherent in mining law revision is the question of money. Responsible fees and rentals are one thing; stiff royalty is another. Neither are necessary or appropriate means to achieve land use or environmental goals. On the basis of the health of the industry in most cases, neither would resolve the problem of the Federal deficit. Taken together and if set at a high level, they can inflict a real penalty on our Nation.

The proposed Mining Law revision bill before us today incorporates some of the important principles necessary to miners, but over all it casts a shadow of hardship and uncertainty over our industry.

The notice requirement for prospecting is restrictive. The bill withdraws additional lands from exploration and mining. Tenure would be less secure through the short claim life, the reversion of patents, the threat of prohibitions against some mining activity, and the potential for discretionary invalidation of claims or extension of mining rights.

The proposed fees, work requirements and royalties seem inappropriate. Replacing the current surface management system and developing entirely new regulations is unnecessary.

I urge the committee to pursue their deliberations on the need for mining law revision slowly and carefully with all interested parties included. Dramatic but precipitous action would throw our domestic exploration and development programs into chaos. I believe that solutions to the issues of mining law revision can be found and that these solutions could be and in fact should be of benefit to all concerned.

In the meantime, I do not believe we need to panic. I think our public lands are in the hands of administrators who do their jobs very well.

Thank you.

[The prepared statement of Mr. Babcock follows:]

TESTIMONY OF RUSSELL C. BABCOCK
TO THE SENATE SUBCOMMITTEE ON MINERAL RESOURCES
DEVELOPMENT AND PRODUCTION
June 7, 1989

Mr. Chairman, Members of the Subcommittee

My name is Russell Babcock. I am an exploration geologist and the Director of Exploration for Kennecott, a company I have served in the United States and other countries for over 30 years. I am pleased to represent here today not only my company and industry, but the Dialogue Group referred to by Mr. Livermore, a small group of miners and conservationists gathered to discuss the issue of mining law revision.

The objective of the Dialogue Group could be stated as the development of a set of policy recommendations that would truly improve the body of hardrock mining law for both parties, not an easy task given the apparently fundamental conflicts that so often characterize the interactions of miners and conservationists. I think it is fair to say that those of us in the Dialogue Group believe that we can find compatibility between the economic-technical and cultural-environmental needs of our nation. The miners in the Group wish to improve their situation under the mining law with respect to tenure, clarity of administration, and especially the mitigation of withdrawals. The conservationists wish to improve environmental protection for public lands and insure protection of non-mineral natural resources. This is a quest well worth pursuing.

It has been agreed within the Group that proposals for radical mining law revision would in the end serve neither party, and that any revisions considered should be both practical and mutually acceptable, that improved conditions for both parties must be achieved. It is not the intent of the Group to promote specific legislation, but to allow their findings to be incorporated into the general discussion revolving around the mining law revision issue. In this atmosphere it appears that the Dialogue Group is moving forward, toward consensus in some areas of mining law revision. But the process of reaching consensus is a long and complicated one, and the Group is clearly only part of the way there. Both policy issues and considerable detail remains to be resolved.

The Dialogue Group has organized its discussions by dividing the topic of mining law revision into nine issues:

Self Initiation
Security of Tenure
Claims
Diligence
Rentals
Patents
Grandfathering
Surface Management and Environmental Protection
Land use planning

I will briefly discuss each of these issues, pointing out areas of common ground and areas where questions remain to be addressed.

Self Initiation: The Group has agreed that a self initiated claim location system, like the one currently in place, should be preserved, and that open federal land should remain available for prospecting and location of claims without prior notice or government approval. Location of a claim should give the locator exclusive rights to explore, develop and mine the locatable minerals on the claims, the right of access to the claim, plus the use of the surface of the claim necessary for such operations, all subject, of course, to approval of appropriate plans.

Claims: The Group favors one type of claim, as opposed to the lode, placer and millsite claims of existing law. The new claim could be oriented and located coincident with the land survey systems, or the projected system in unsurveyed areas. Such a claim could be controlled by a location monument in unsurveyed areas or by a monument plus a legal description in surveyed areas. Filing would reflect current practice. Such a system should provide a clear picture of claim locations, allow the surface management agency to resolve conflicts, and provide for generally simpler administration.

Security of Tenure: The validity of the new unpatented claim would be established and maintained by satisfying location, diligence and filing requirements, rather than the less certain doctrine of pedis possessio and the discovery requirements of current law. The right to a patent provides security of tenure once valuable minerals have been discovered.

Diligence: The Group has agreed that increased assessment work requirements would promote diligent exploration and development, and feels that escalating the requirement in several stages would further serve this purpose. Qualifying expenditures could be expanded to include those required for environmental studies and reclamation.

Rentals and Fees: The Group has agreed that there should be payment of surface rental fees for lands involved in mine development and production, where other surface uses are preempted. A fair market value basis seems acceptable but needs definition. It was noted that the current fee schedule for filings and patent applications is subject to adjustment by the Secretary of Interior as appropriate, perhaps a better way to approach this subject than to incorporate specific amounts in any new legislation.

Patents: The Group has discussed the patenting issue at some length and tends to agree that a minerals-only patent would meet the miners requirement for security of tenure while at the same time assuring responsible environmental performance and consideration of non-mining values, by virtue of the surface remaining under federal government management authority. Exploration, development and production activity would then remain subject to approval of plans of operation, including reclamation. It has been suggested that the patent be issued on the basis of the more realistic prudent man rule, not the current, more stringent marketability test. This would improve the security of tenure for the miner, while at the same time eliminating the possibility of using the claims for non-mining purposes. The mineral patent would retain the same rights of access and surface use granted to the locator of the claim.

Grandfathered Rights: Holders of existing claims should have their rights under the existing law preserved for a period of years sufficient to effect an orderly transition from one system to the other. During such a transition period the claim could be converted to a new claim or patented under the existing law.

Surface Management and Environmental Protection: General agreement exists in the group that prospecting and non-disturbing exploration activity on open public land, including the location of claims, should not require notice or government approval. Certain exploration activities causing minimal disturbance should be allowed, subject to filing a notice with the federal surface management agency. Activities above this minimal level would require that a plan of operations be submitted and approved. Any disturbance would be subject to reclamation. Threshold levels need to be defined and reclamation bonding would be required. This system is essentially that which is in operation on Forest Service lands today, and it works well for both the miners and the agency, and provides for site specific consideration of non-mining surface values.

Bonding is a particularly tough subject. Procedures that are fair to large and small miners, yet insure responsibility, are not easy to define. Bonding requirements are necessary, but, if not carefully handled, can erode the miners security of tenure by making it impossible to pursue diligent exploration and development.

The miners in the Group feel strongly that reclamation and bonding are matters for the surface management agency and its body of law and regulation, and that a separate set of laws and regulation as part of a revised mining law would only be duplicative and counterproductive. The Group recognizes that most states have, or will soon have, well developed reclamation laws, and that all federal and state environmental legislation regarding clean air, clean water and hazardous wastes already apply to mining activity, regardless of whether such activity occurs on federal, state or private land. The concern is assuring adequate coverage, implementation and compliance.

Land Use Planning: Current BLM and USFS procedures require that when a plan of operation is under review sensitive areas are considered and restrictions and/or conditions applied to mineral exploration and development activity. In some cases these conditions may be so restrictive that exploration or development is not practical. Depending on the process, there may be some advantage to the miners in having restrictions outlined in the land use plan so the degree of difficulty can be anticipated before undertaking significant exploration expenditures.

> The Group is discussing the possibility of expanding agency land use plans to define special areas where restrictions or conditions might be imposed on minerals-related activities, and whether some activities in certain specified sensitive areas such as ACEC's and endangered species habitat might in fact be prohibited. To balance such an imposition of potentially restrictive classifications, a procedure would need to be established to amend land use plans to remove or decrease such restrictions, conditions or prohibitions. This amendment procedure might apply to certain existing withdrawals. The ideal situation would be to eliminate or reduce the need for withdrawals and substitute a more flexible, site specific classification and reclassification process. The danger to miners is that this land use planning process might create a new defacto withdrawal mechanism. This threat would be theoretically offset by the amendment procedure and the ability to decrease restrictions where appropriate. The ability to prospect and locate claims in such sensitive areas would assure an ongoing evaluation of the mineral potential.

Up to this point I have restricted my comments to the work of the Dialogue Group, and not specifically commented on the proposed legislation before us. In the context of the nine issues under discussion by the Group, the bill has some positive features but in general imposes terms and conditions which would be difficult for either a small or large miner to meet. Some specific comments follow:

> **Self initiation:** The concepts of self initiation and surface use of claimed and adjacent lands are present in the bill, thus preserving one of the basic principles necessary to the mineral industry. The requirement that advance notice be given for prospecting is contrary to the principle of self

initiation, however, in that it implies a discretionary process of approval. The open federal lands need to be freely available for prospecting without notice, to allow unimpeded selection of mineralized areas and the location of claims.

Claims: The concept of a new claim aligned on public land surveys is workable, but specifying the mineral sought is unnecessarily restrictive.

Security of Tenure: Several aspects of the bill encroach on the principle of Security of Tenure. The ability to invalidate a claims through disapproval of an exploration plan, the 10-year life of a mineral claim followed by a stringent application of marketability to obtain a patent, the reversion of the patent, and the institution of prohibitions against mining during land use planning all pose serious risks to a miner's tenure. The patent may offer some temporary security, but is a reversible rather than a perpetual title.

Diligence: The fees and expenditure requirements are punitively high, well beyond amounts consistent with the concept of diligent exploration and development.

Patent: Issuance of title to the minerals, subject to royalties and reversion or discretionary extension upon cessation of production, is in essence a lease. Such a title may not offer the longer term security required by the miner to weather the economic cycles and technology development requirements typical of the mineral industry.

Grandfathering: The process for dealing with existing claims is again punitive. Holders of existing claims would have little or no opportunity to establish discovery under the marketability test and proceed to patent. Transition to the new system would be chaotic, unless adequate time is provided for the miner to efficiently pursue his exploration to a logical decision point.

Surface use Management and Environmental Protection: The requirement in this bill for the establishment of new regulations governing reclamation, and the requirement of new exploration and mining plans, suggests a duplication of the existing Forest Service and BLM regulations, and may result in conflicts with these and other existing law governing the environmental aspects of mining activity. In essence, the current plan of operation approach is working, and given a chance to develop some administrative maturity, will do even better. The concepts of restoring land to a previous condition and pit backfill, for instance, are particularly alarming requirements to an industry operating on small margins in a world market. Bonding provisions have to be much more carefully considered than they have been to provide both the ability to operate and assurance of responsible reclamation.

Land Use Planning: The requirement that land use plans consider the impact of mineral exploration and development activity could delay issuance of new plans of operation, given the speed at which such plans are prepared. The industry and the nation can not afford to have its exploration program set on hold for several years while the inherently uncertain relationship of mineral and surface values are debated.

Miners feel that the ability of the land manager to prohibit certain minerals exploration and development activity as provided in this bill could be considered a withdrawal capability. On top of this, the definition of locatable lands appears to withdraw lands now open to location. In fact, efforts should be made to open withdrawn lands in areas where responsible exploration and development can be achieved in a manner consistent with other values.

Mr. Chairman, members of the Committee, I would like to close my remarks by saying that mining law revision should be a process which results in improvements for the miner, the conservationist, and the administrator, all three of which are a necessary part of our society. The mining industry has been clear and consistent on stating its needs with respect to operating on the public lands. The Conservationists are likewise clear on what is required to protect the environment. It should be possible to combine these two in such a way that both parties will be served. I ask your patience and thoughtful consideration in approaching this task. If this effort is successful, the nation and its administrators will also be well served.

Senator **Bumpers**. Thank you, Mr. Babcock.

I would like to note for the record, Senator McClure, that in the interest of time, for example, we did not let the Audubon Society testify, and there were some public interest groups, and their testimony will be admitted to the record.

Mr. **Livermore**. Mr. Chairman, the Audubon Society is part of this dialogue group.

Senator **Bumpers**. I know they are. My staff handed me a note to that effect, and that is what reminded me about letting them note their testimony in the record. I am told by staff we received a lot of statements, and we want the record to be open for all interested groups.

Mr. Babcock and all of you gentlemen, you have testified extremely well and intelligently and have been helpful to this committee.

Mr. Babcock, let me just ask you two or three short questions. Number one, you mentioned withdrawals. I think until this law is revised everybody will have their own view about it, whether it needs it or what kind of revisions are needed and so on. I do believe that there is a perception particularly among the conservation environmental groups.

You heard Mr. Hocker testify earlier that there are over 60,000 acres of mining sites that have been abandoned since FLPMA was passed. That is just unacceptable to a lot of people, and I think that creates tremendous pressure for additional withdrawals.

When we have a responsible law that requires reclamation, and people feel a little more secure that the law, whatever it is, is going to be enforced and that NEPA and the Clean Water Act and the Clean Air Act and fugitive dust, all the environmental laws are going to be enforced. These groups are going to continue to demand additional withdrawals to take lands away from the opportunity because they do not think it is going to be handled with a good stewardship. So that is an additional reason to try to address this law.

Number two, I appreciate very much what you have said about patenting of minerals. I think I feel as strongly about that as I do anything, because it is not in the miner's interest and it is not in anybody's interest to allow some of these people to take these lands. We all know you can patent this land and the BLM never looks at it again to determine whether you have actually mined it or sold it to a ski resort.

If you allow people to continue patenting the land but just the minerals with the surface reverting to the United States, it seems to me that you have gotten about 98 percent of that problem solved. As long as they cannot alienate the land, we are not going to have that problem.

The things that Mr. Livermore said that his organization would like to see in here—you want some certainty, you want to make sure that these people have reasonable access to ancillary lands and things like that—those are not big problems as I see it.

Reclamation is a big problem. Fraud among these people who patent lands, file specious claims and so on and ultimately sell them for fancy profits, those are the real problems of this law.

Thirdly, let us get down to the royalty thing. Does Kennecott operate on quite a bit of Federal land?

Mr. BABCOCK. Yes, we do, sir.

Senator BUMPERS. What do you mine in this country?

Mr. BABCOCK. Kennecott is a major copper miner——

Senator BUMPERS. But you mine other minerals, do you not?

Mr. BABCOCK. And gold. Yes. Our mines are copper and gold plus a lead/zinc/silver/gold mine in Alaska.

Senator BUMPERS. Is that on Federal land also?

Mr. BABCOCK. That is, yes. That was the Green's Creek mine that was referred to earlier.

Senator BUMPERS. I think Senator Murkowski referred to that.

Mr. BABCOCK. Yes, that is right.

Senator BUMPERS. Mr. Babcock, do you also operate on State lands?

Mr. BABCOCK. Yes, we do; to a very limited extent.

Senator BUMPERS. Where do you have a mine on State lands?

Mr. BABCOCK. We have a mine that we are developing on State lands in the State of Utah.

Senator BUMPERS. What kind of mining do you intend to do there?

Mr. BABCOCK. It is a small gold mine.

Senator BUMPERS. Does Kennecott use the heap leach mining system?

Mr. BABCOCK. Yes.

Senator BUMPERS. Is that the state of the art for gold mining now?

Mr. BABCOCK. Well, for particular types of ore it certainly is. It is the only feasible way to recover gold economically.

Senator BUMPERS. Incidentally, do you have to pay the State of Utah a royalty?

Mr. BABCOCK. Yes, we do.

Senator BUMPERS. How much?

Mr. BABCOCK. It is 4 percent of some amount which is not a gross amount. It is a net amount, but I am not sure of the calculation.

Senator BUMPERS. We will look that up. I am interested because I think Mr. Delcour made a very good point; that is, just to say 8 percent royalty without determining how that royalty is going to be based, that is something that we discussed and recognized but could not deal with immediately. His point is well taken. We need to examine royalties on different classes of minerals, find out how other countries, states and even the private sector treat those things, and try to reach some kind of an agreement on that.

One final question. On heap leach mining, gold mining, I was down in the Amazonian Basin camped out in the jungle a couple of months ago. I went down there really to look over the tropical rain forest, but we got into a whole host of issues.

Incidentally I said when I went down there I had never slept in a hammock before, and I can tell you I still have not.

We discussed the gold mining in the Amazonian Basin. Talk about an environmental disaster. As you might guess, number one, Brazil's environmental laws are very lax. Number two, most of the mining is going on without the government's permission or knowledge. People just go in and find a place.

They are still using the mercury process of mining there, and the environmentalist groups there told us that the mercury content of the Amazon River continues to climb even though President Sarnet told us they had banned mercury mining. They do not even know what kind of mercury mining is going on. I forget what their royalty is, but they are probably not collecting on more than one out of every five tons of gold that is mined.

This heap leach mining which uses cyanide is troublesome to me just because cyanide is such a horrible sounding word. According to pictures I have seen and the way it has been described to me, you stack the ore up which presumably has the gold in it and you use something like drip irrigation system where the cyanide drips into this ore, attracts the gold and runs out to pipes down below.

The only thing that keeps that cyanide out of the ground and possibly out of the groundwater is a big plastic sheet underneath the one.

I am going to do my very best to visit one of those sites because a lot of people are concerned about this type of mining, and I am deeply concerned about whether plastic is sufficient.

Is that something the EPA has approved of, or do you know?

Mr. BABCOCK. Yes. That is approved by the local authorities under a scheme which is approved for that particular site. Each site is different in terms of what is required. I am not a mining engineer, but let me try to explain the process.

The pad on which heap leach is established consists of a firm rock foundation and then impermeable clay material usually and then a drainage level with sand or something and then a plastic layer and then a protective layer over that. So there are actually several types of sealants in the pile, one of which is usually a plastic liner. Sometimes there are two plastic liners.

Senator BUMPERS. I have been told that there have been several instances of leaks in those liners.

Mr. BABCOCK. Yes, but let me point out that that is somewhat of a self-policing happenstance, because what leaks out is the gold. So the miner is very eager to collect every last drop of that solution because that is what has his gold in it.

In any operation, yes, there are perhaps chances for something like that to happen on a small scale.

Senator BUMPERS. Does cyanide have a corrosive quality to it?

Mr. BABCOCK. Not that I know of.

Senator BUMPERS. It is not acidic?

Mr. BABCOCK. No.

Senator BUMPERS. It is just used for poisoning your wife and making gold?

Mr. BABCOCK. It depends on how you get along. It usually has a short half life.

Senator BUMPERS. It does have a short half life?

Mr. BABCOCK. It does not persist in the environment. It is a natural occurring substance in very small quantities. It is an organic chemical that in time diffuses or disassociates or something like that. It is not something that lives forever. It is not a mercury type of material.

Senator BUMPERS. Thank you, Mr. Babcock.

Senator McClure.

Senator McCLURE. Just a couple of questions. First, on this last subject, have there ever been any persons injured because of cyanide leakage?

Mr. BABCOCK. I do not know that there have. I have not heard of any. I think I just heard someone saying recently that there have been no deaths or anything like that attributed to those kind of operations.

Mr. LIVERMORE. There is no known case of any death from cyanide.

Senator McCLURE. To the best of my knowledge, that is true. It has a terrible name, but the name is much worse than the effect apparently.

Mr. GREENWALT. There is always the possibility of some of this escaping into the groundwater; with what consequences, I do not know, but I am unaware of any circumstance in which that has happened thus far. This is a relatively new process and a very efficient one, as you know.

Also, as I understand it, the cyanide material can be neutralized very quickly and is done once the gold is extracted. So it is made further benign as the process goes on.

Mr. LIVERMORE. We can provide you, Senator, with the surveys of this. The EPA has made studies on this, and there are reports that verify there are no known fatalities from cyanide.

Senator BUMPERS. A lot of birds have been killed.

Mr. LIVERMORE. Yes, that is right. There has been wildlife——

Senator BUMPERS. Senator, if you would yield.

Mr. Babcock, do you all put nets over your cyanide pools?

Mr. BABCOCK. No, we do not. What we do in some instances is to place flags and things like that around which will disturb the birds, or sometimes where you have a population of birds going through we sit somebody out there with a shotgun shooting off blanks or something like that at times when that might occur.

Senator BUMPERS. Is it cyanide pellets that states use in the gas chamber to execute people? Is that not what they drop?

Mr. LIVERMORE. That is right.

Mr. BABCOCK. We are talking about a very, very low level of cyanide concentration.

Senator McCLURE. Mr. Snow looks like he is eager to add something.

Mr. SNOW. You are talking about a different compound. The compound that is used to kill people is hydrogen cyanide gas. Cyanide is made up of carbon and nitrogen. These are naturally occurring elements, and it is a naturally occurring compound. In an acid environment it generates a gas, hydrocyanic gas. That is poison.

Cyanide in and of itself is not poison, and the miners keep it in a high pH alkaline environment. There is no gas generated. It biodegrades and oxidizes readily.

Senator BUMPERS. But it obviously will kill birds.

Mr. GREENWALT. Apparently in the concentration in which it appears in the pools. Lots of other things attract birds and kill them, like sunk pits from oilfield developments and things of this kind which attract birds frequently when that is the only water game in town as is often the case in the arid west where these heat bleach operations are working.

Senator McCLURE. I was struck by one part of your summary, Mr. Livermore. In your list of things that you were striving to achieve, you included something to cause due diligence.

Do we have a problem of people sitting on mining claims? What is the problem we are trying to solve with respect to due diligence?

Mr. LIVERMORE. I think, Senator, the question of due diligence ties into the elimination of the discovery requirement in our consensus proposal. So in lieu of the discovery requirement, the due diligence requirement would have to be accelerated.

Senator McCLURE. Why do you want to get rid of the discovery requirement?

Mr. LIVERMORE. The discovery requirement, Senator, is observed in the breach. It arose in the gold rush days when the ore was on the surface. Every small miner made his discovery. That was characteristic of mining in those days.

It has been said some 90 percent of the claims in the United States are invalid because of lack of discovery.

Senator McCLURE. That may well be, but what is the harm of an invalid claim if in fact it is invalid? Does that not correct itself?

Mr. LIVERMORE. Well, it does, but it makes it very, very difficult in some cases to get good title to claims.

Senator McCLURE. Why does it make it difficult to get good title? Because somebody has an invalid claim and somebody else has a valid claim?

Mr. LIVERMORE. That is right; because someone has not done the discovery. There is the case you have probably heard of, *AMAX* v. *Mosher,* where there were two claimants to property, and the Federal judge said that since neither one had done the discovery work the land was open even though they had been on the property.

Senator McCLURE. Is that a problem?

Mr. LIVERMORE. It posed a considerable problem because the operator was told that they had no claim and———

Senator McCLURE. Why should they have a claim if they have no mineral?

Mr. LIVERMORE. They thought they had a mineral. They had to bring on armed guards to protect their activity because the Court had said that because there was no discovery they had no right.

Senator McCLURE. What did they have an armed guard to protect?

Mr. LIVERMORE. They had armed guards to protect their activity because they wanted to do mining on the property.

Senator McCLURE. Mining what if they had no mineral?

Mr. LIVERMORE. They thought there was mineral present, but they had not yet made the discovery.

Senator McCLURE. So they wanted to mine even though there was no mineral there?

Mr. LIVERMORE. No, they thought there was mineral there.

Senator McCLURE. What were they doing, dousing?

Mr. LIVERMORE. They were doing surface work. They just had not yet made a discovery under the law.

Senator McCLURE. I am really puzzled by a miner that wants to spend a lot of money on property because he has a hunch there might be something there but he has not yet discovered it.

Is that what it was?

Mr. LIVERMORE. No. They had a good faith opinion that there were minerals on the property; and there was another claimant, and then the other claimant got——

Senator McCLURE. Well, tell me. Did they ever find anything there?

Mr. LIVERMORE. Yes, they finally did.

Senator McCLURE. They finally what?

Mr. LIVERMORE. They finally found minerals on the property.

Senator McCLURE. They finally found it?

Mr. LIVERMORE. That is right.

Senator McCLURE. The minute they found it they then had a discovery?

Mr. LIVERMORE. That is right.

Senator McCLURE. So what you are really distinguishing, then, between is the right to explore the prospector's permit versus the right to file a claim?

Mr. LIVERMORE. That is right.

Senator McCLURE. Could they be protected in this instance under a prospector's permit? You do not have to have a discovery to prospect.

Mr. LIVERMORE. Under the current law, you have to have a discovery to have a valid unpatented claim.

Senator McCLURE. But you have a right under current law to go prospect?

Mr. LIVERMORE. That is right.

Senator McCLURE. But you cannot have a claim until you discover something?

Mr. LIVERMORE. That is correct.

Senator McCLURE. Now, is that appropriate?

Mr. LIVERMORE. Appropriate to not have a claim until you get discovery?

Senator McCLURE. Yes.

Mr. LIVERMORE. Well, that is the law. As I say, Senator, it used to be——

Senator McCLURE. If that is the current law and if that is appropriate, then why do we have to change the law to do something different?

Mr. LIVERMORE. Well because, as I say, about 90 percent of all the claims in the country just do not have discovery.

Senator McCLURE. Then they are not valid claims.

Mr. LIVERMORE. That is right.

Senator McCLURE. Then what is the problem?

Mr. LIVERMORE. The problem is that the title to these claims is invalid.

Senator McCLURE. That is right. Who is hurt by that?

Mr. LIVERMORE. They are hurt because someone can come in and overtake your claim at any time.

Russ, maybe you can——

Mr. BABCOCK. Senator, may I respond to that a little bit? We are talking about prediscovery rights, the rights during the time at which you have an exploration program going forward on the land.

Senator McCLURE. The right to prospect.

Mr. BABCOCK. No, the right to maintain exclusive right over a third party during——

Senator **McClure**. You do have that under existing law?

Mr. **Babcock**. It is very tenuous.

Senator **McClure**. It is very tenuous because you are supposed to find something.

Mr. **Babcock**. Yes, but there is always a time period between when you——

Senator **McClure**. And you want to expand the time period in the prediscovery phase, the prospecting phase?

Mr. **Babcock**. Not necessarily the time period but the security for the exploration program and the——

Senator **McClure**. How long do you need to do that?

Mr. **Babcock**. Well, it varies from place to place depending on how easy the minerals might be to explore and whether those minerals that you find are immediately economic or not.

Senator **McClure**. All right, but that is a question that is different from the one of requiring a discovery before there may be a claim.

Mr. **Babcock**. The two are tied together.

Senator **McClure**. But you are asking for security of tenure during a prediscovery activity.

Mr. **Babcock**. That is right.

Senator **McClure**. You do not have to have a claim, and you do not have to file a claim in order to do that.

Mr. **Babcock**. Yes, you do, in terms of drilling and that sort of thing.

Senator **McClure**. You have to have a permit, but you do not have to file a claim.

Mr. **Babcock**. No, there is no permit involved in that. The process is that you decide on an area that you want to explore. You stake some claims by putting out location monuments and file those in the courthouse. That protects your right against some other miner. Then you go out and begin to do serious exploration, which may take a short time or it may take years.

Senator **McClure**. As a matter of fact, you have to get a permit to do any activity out there that disturbs the surface.

Mr. **Babcock**. That is right, that is the surface disturbance——

Senator **McClure**. You want something that protects you before you have made the discovery even though you do not have the right to a claim.

Now you say you go out and file the claim. As a matter of fact, that claim is invalid until you have made a discovery under current law.

Mr. **Babcock**. Under current law; that is right.

Senator **McClure**. So what you are doing is a violation of current law.

Mr. **Babcock**. There are two principles involved, and the one that maintains your right at this time is called pedis possessio. You heard Mr. Delcour saying that as long as you are out on the ground sort of protecting it physically, you can assert your right over an adverse claimant. The problem is that you cannot stay out on the grounds 24 hours per day, 365 days of the year. It is a process that does not involve that.

So pedis possessio gives you some right over the third party but——

Senator **McClure**. But it does not entitle you to file a mining claim.

Mr. **Babcock**. You have already filed the claim that——

Senator **McClure**. But it is invalid.

Mr. **Babcock**. That is right. It is as good as it gets, but it is not valid in terms of a valid discovery.

Senator **McClure**. It ain't worth much.

Mr. **Babcock**. What we are saying is, there might be a way of making it worth something.

Senator **McClure**. As I understand Mr. Livermore to say, you fellows are part of the problem, because you are filing invalid claims.

Mr. **Babcock**. I guess so in that case.

Senator **McClure**. Let us just separate the problem. That is what I hope we will do in these hearings is identify the problems we are trying to correct; and we have identified one here. Mr. Livermore says you should not be permitted to file a claim, and you are saying but I have got to have a way of protecting myself while I am exploring.

Mr. **Babcock**. That is right.

Senator **McClure**. Did I misstate what you said?

Mr. **Livermore**. That is right.

Senator **McClure**. I do not want to misstate. I want to understand.

I think for those rather generalized statements that a high percentage of the claims are invalid, is almost irrelevant to the discussion, because I do not know who is hurt by it. If they are invalid claims, people do not have any right, it will not ripen into any right, they cannot exercise anything against anybody else, they have kind of wasted their time and effort.

Now, the fact that they can read an ad in some paper somewhere that says I will go stake you a claim for something, you know, con men operate all over the world and have throughout recorded history at least, and still do. But I do not know that the public or the public lands are hurt by that kind of activity, which ripens into no kind of right at all.

They apparently pay enough to cover the costs of filing the papers, so the government is kept whole. I know they pay enough to the county for filing the papers at the county level, so the county is not hurt.

I do not quite perceive where there is a problem, even though it may be a fact that people file invalid claims. If you are out there doing something else during that period of time while you are trying to prove up on a claim and trying to make the discovery, that is a separate issue which I think can be handled as a separate issue without saying you should not have a discovery in order to have a claim.

I am not sure I want you to have a claim unless you have a discovery. Unless you can show me that you have some mineral value in that land, why should you have a claim on it? That seems to me to be running counter to what we are trying to accomplish here.

Mr. **Babcock**. I do not believe we are saying we should have claims that do not have valid mineralization. The process is one of a two-phase operation, first exploration followed by discovery and evaluation of a valuable mineral deposit. And then under the current law, it is patenting that claim and regaining or gaining fee ownership of the claim; and at that point it becomes a valid claim in the eyes of the Federal Government.

Senator **McClure**. If it is a valid claim before you get a patent.

Mr. **Babcock**. At the point you make a discovery and while you are applying for a patent, if that is what you choose to do.

Senator **McClure**. You can hold a claim without ever going to a patent.

Mr. **Babcock**. You can, but until you have a patent, your rights are still subject to third party encroachment.

Senator **McClure**. Not if you have a valid claim, they are not.

Mr. **Babcock**. You can take them to court, and the court would find that your claim is valuable if you can demonstrate that you have marketable mineralization on that claim, enough to make an operation.

Senator **McClure**. Which is the same thing that is required to get a patent.

Mr. **Babcock**. Yes, that is right.

Senator **McClure**. So if you have got a valid claim, nobody can jump that claim. There have been people shot trying it.

Mr. **Babcock**. Yes, that is right.

Senator **McClure**. And I would suggest that that may still happen.

Mr. **Babcock**. Oh, it does.

Senator **McClure**. If I have got a claim, do not assume you can come over and jump my claim just because I have not patented it.

Mr. **Babcock**. That is right. That is not the issue. The issue is——

Senator **McClure**. All right. That is not the issue, and that is not a problem.

Mr. **Babcock**. That is right.

Senator **McClure**. All right. We do not have to correct that one then.

Mr. **Livermore**. Senator, there is a distinction between a discovery requirement for a patent, of course, and having the discovery requirement for an unpatented location claim.

Senator **McClure**. Yes, indeed there is.

Mr. **Livermore**. And so there is some body of opinion that although the discovery requirement should not be eliminated for a patent, that it should be eliminated for the unpatented claim and higher diligence substituted. I am just stating what the general——

Senator **McClure**. Okay, but I want to test that for just a minute, because I do not accept that.

Mr. **Livermore**. I know you do not.

Senator **McClure**. And it seems to me, there is indeed a higher requirement in order to get to a patent; I think there ought to be.

Mr. **Livermore**. That is right.

Senator **McClure**. But certainly if you can satisfy the requirements for a patent, you have satisfied the requirements for a valid claim.

Mr. **Livermore**. Sure.

Senator **McClure**. The requirements for a valid claim are lesser than the requirements for a patent.

Mr. LIVERMORE. That is right. So certainly if you have satisfied the patent requirements, you have satisfied the claim requirements.

Senator MCCLURE. That is right. You cannot get to the patent unless you have had a valid claim.

Mr. LIVERMORE. That is right.

Senator MCCLURE. And I want to make sure that the people who hear the discussion understand that. I know you do, and I know I do.

Okay. Then you talk about a due diligence requirement——

Mr. LIVERMORE. For a claim.

Senator MCCLURE. For a claim.

Mr. LIVERMORE. For a claim. For an unpatented claim.

Senator MCCLURE. Not for a patent.

Mr. LIVERMORE. That is right. For an unpatented claim.

Senator MCCLURE. Once you have got a patent, you can sit on it forever.

Mr. LIVERMORE. Fee simple title.

Senator MCCLURE. Fee simple title to the minerals in place.

Mr. LIVERMORE. Well, that would be—under the existing law it is fee simple title.

Senator MCCLURE. That is correct. But what are you advocating?

Mr. LIVERMORE. Under the proposal of the dialogue group, it is fee simple title to the minerals alone.

Senator MCCLURE. How about a patent that grants fee simple subject to a reversionary clause?

Mr. LIVERMORE. Well, the dialogue group has not come to a consensus on that, Senator.

Senator MCCLURE. Is there much difference between the two?

Mr. LIVERMORE. Well, there is, because if you have a term, what you are saying, a term on the patent—and I believe——

Senator MCCLURE. I am not talking about a term. I am talking about the purpose for which you hold it.

Mr. LIVERMORE. Well, there are two parts to the limited patent. One is patenting the minerals only, and the other is to have a term.

Senator MCCLURE. Well, I was not talking about that as the alternative.

Mr. LIVERMORE. Just the minerals, right.

Senator MCCLURE. No. I was talking about a fee simple title to the land, surface and everything——

Mr. LIVERMORE. Right.

Senator MCCLURE [continuing]. So long as you hold it and use it for mining purposes.

Mr. LIVERMORE. That is right.

Senator MCCLURE. So long as you do not convert it to some other purpose, or attempt to convert it to some other purpose.

Mr. LIVERMORE. You mentioned that earlier this afternoon.

Senator MCCLURE. If you were going to attempt to divert it to another purpose, it would revert to the government.

Mr. LIVERMORE. That is right.

Senator MCCLURE. Now, is that a satisfactory solution to the question that we are addressing with respect to the patent for reasons other than mining?

Mr. LIVERMORE. Well, you asked that earlier and got a favorable response. I think it would be, just personally.

Senator MCCLURE. I understand that, and we are trying to identify problems, and then where there are some, identify solutions.

Mr. LIVERMORE. I think that the mechanisms of arriving at that, Senator, might be difficult. There is existing law that you cannot use the surface for nonmining purposes, so there is a question of how you define it and what the enforcement would be. But certainly that would be quite a stringent sanction.

Senator MCCLURE. But you are not attaching any due diligence requirement to the use of the land following patent.

Mr. LIVERMORE. No. Absolutely not, no.

Senator MCCLURE. Mr. Greenwalt?

Mr. GREENWALT. I was about to observe that it seems to me, at least from the conservationist point of view, the patent to the body of ore, once the ore body has been extinguished, would expire, just as I presume the case would be in terms of the reversion, because you could no longer mine.

Senator MCCLURE. Well, one of the difficulties you have is that many ore bodies are not that finite.

Mr. GREENWALT. I understand.

Senator MCCLURE. It is hard to define when it is gone.

Mr. GREENWALT. Just as it might be hard for the surface to say it is no longer entitled to the miner because we do not know whether he is still mining or not or has something to mine. As long as he does not build a dance hall on it or sell it to a ski lodge, I do not think we would have any problem with that.

Senator MCCLURE. All right. And the second problem with extinguishing the right is the fluctuations of market.

Mr. GREENWALT. Oh, absolutely, yes, yes.

Senator MCCLURE. I have long felt——

Mr. GREENWALT. A cessation of activity is not the same thing as mining the body out.

Senator MCCLURE. Yes. And so you are not talking about an abandonment——

Mr. GREENWALT. Precisely.

Senator MCCLURE [continuing]. In terms of cessation of activity or even extinguishing the right because of what might otherwise be called abandonment.

Mr. GREENWALT. That is right, sir.

Senator MCCLURE. Although we might get into that and might try to find some solution that is built around it. I do not know that there is one there.

Mr. LIVERMORE. I think, Senator, going back, if I may, to the question of diligence on the unpatented claim as distinguished from the patented claim, having a diligence requirement in place of discovery would confirm your ownership of the claim to a greater extent than is presently the case. You say well, it does not make any difference if you have these invalid claims, but for people who are out exploring and prospecting, it is helpful to have greater certainty in the rights during that very, very crucial first phase.

And I submit, as I said before, that that *AMAX* case is a devastating case. If diligence had been the test, there would have been no question. The person who would have filed the claim, doing the diligence work, would have protected their right. As it was, it was just completely uncertain.

And I just submit to you, Senator, that there is an uncertainty there that would be rectified in that first important stage——

Senator McClure. Before discovery.

Mr. Livermore. That is right. Before discovery and to prevent the claim jumping of people who are professional claim jumpers, that sort of activity, and to protect the bona fide explorers during this fragile first phase where there may not be discovery, where it may not be even possible to be out, as Russy said, all year round on pedes possessio. It would be a greater protection.

Senator McClure. Then we may be talking about three phases here. One is the exploration phase; the other is the post-discovery phase; and the third—well, what happens if you wish to move the patent.

Mr. Livermore. There would be the discovery requirement for a patent.

Senator McClure. You have a discovery requirement for a claim now.

Mr. Livermore. That is right.

Senator McClure. What you are suggesting is change the law so you do not have to have it.

Mr. Livermore. That is right. But only in the claim stage, Senator.

Senator McClure. Oh, I understand that. But you would require people, to have any kind of a right other than the exploration right, they would have to go to patent.

Mr. Livermore. That is right.

Senator McClure. That is a greater change in the law than I think is required.

Mr. Livermore. No, no. You would have to have a discovery to go to patent.

Senator McClure. Yes.

Mr. Livermore. Under our proposal.

Senator McClure. But you do not have to have a discovery to have a claim.

Mr. Livermore. That is correct, Senator.

Senator McClure. Under your proposal.

Mr. Livermore. That is correct.

Senator McClure. I understand your proposal. I do not want to imply by that that I agree with it.

Thank you.

Senator Bumpers. I can tell you, based on this debate, this bill is very timely. If I have heard anything that it needs to be redressed and straightened out this dialogue between the two of you just now makes a compelling case as far as I am concerned. [Laughter.]

Senator McClure. Well, Mr. Snow had the answer, though, really to all of that problem, is that is get them out of the mining business quick enough that they can go to law school.

Senator Bumpers. It seems to me that you have made a pretty good case for just allowing people to file on a tract of ground say for $100. And if we could all agree on some term certain that that claim—we will call it a claim at that stage—not the kind of claim he is talking about, but we will just say you are staking a claim on

20 acres of ground, and we will say you are going to pay $5 an acre a year annual renewal; and if at the end of 10 years you do not have a sufficient enough discovery to patent it, your claim expires.

Maybe 10 years is not the right period of time, but I am just simply saying you eliminate all of this confusion about claims, and discoveries for patent, and no discovery in order to stake a claim, and this guy protecting his land with armed guards, or somebody upstaging his claim. It looks to me like you ought to allow people to simply file with the BLM their claims and pay $100 on whatever tract it is, 10, 20 acres, let them pay an annual renewal fee. It is theirs to explore until they find something or until they decide there is not anything there. Why should we have the courts resolving this kind of a thing for us?

Does that make sense to you, Mr. Livermore?

Mr. LIVERMORE. Well, I think greater certainty in the claim stage makes sense, Senator.

Senator BUMPERS. I mean to say, this is the certainty everybody is talking about.

Senator MCCLURE. Can I pose a hypothetical under that?

Senator BUMPERS. Yes.

Senator MCCLURE. Let us assume that there is an environmental organization or a citizens group that wants to protect an area against any kind of activity, and they know there is going to be some activity there, whether it is a municipality's garbage dump, the Forest Service wants to build a road, or whatever activity you might dream up; they go out and blanket the area with claims.

Senator BUMPERS. What is to keep them from doing that now?

Senator MCCLURE. They would not last very long doing that now.

Mr. BABCOCK. Well, excuse me, Senator. What applies at this time is that they have to pursue exploration and development of the claim under the law, and if they do not have a discovery, then those claims can be either adjudicated by the government as invalid or someone else can come in and stake a claim that——

Senator BUMPERS. My bill has a fairly stringent diligence requirement. Maybe you could add that. That will keep the—the proposition you are talking about—that will keep the environmental groups from going out and staking massive areas, if you have a diligence requirement on it.

Mr. BABCOCK. There is no system which will completely exclude the extraneous user. You cannot build a system that is——

Senator BUMPERS. I think that is true. I think you can eliminate a lot of the things that Mr. Livermore and Senator McClure were talking about, to eliminate somebody overstaking your claim, and what you have to do in order to perfect your claim and what kind of discovery you have to have.

The truth of the matter is, under existing law, whether we like it or not, BLM is taking affidavits of discovery. I do not think they are really going out to look to see if you have—when you say I have discovered something here, and I want a patent on this, it is my opinion that BLM ought to, but they are not actually going out and——

Mr. BABCOCK. When you apply for a patent, they do; they must. They must make an independent test of validity at that time, independent of the miner.

Senator **Bumpers**. Well, staff tells me that I am wrong, that they do do this on patents, but they do not on claims. Is that correct?

Mr. **Babcock**. They do it on claims if there is a competing use that comes up for the land.

Senator **Bumpers**. Mr. Babcock, I had one other question. Where you are mining in Utah, do you pay both a severance tax and a royalty?

Mr. **Babcock**. I am not sure what the entire tax scheme is in the State of Utah. I can find that out.

Senator **Bumpers**. Well, I wish you would get that. Well, we can find that. We have got a big law library back here.

Gentlemen, you have all given fine testimony. It is very helpful to me.

Senator McClure has been in this all of his life. He is much more aware of these specific problems than I have. And all of you have been in it much longer than I have, but you certainly have been very helpful to me this afternoon. We thank you very much for being here.

Our next panel is Mr. Stephen Alfers, Attorney, Davis, Graham and Stubbs, Denver, Colorado; Mr. John Leshy, Professor of Law, Arizona State University School of Law, Tempe, Arizona.

Mr. Alfers, your name is number one on my list, so would you please proceed?

STATEMENT OF STEPHEN D. ALFERS, PARTNER, DAVIS, GRAHAM & STUBBS

Mr. **Alfers**. Thank you, Senator.

Mr. Chairman, members of the subcommittee, I am Stephen D. Alfers. I have submitted a written statement dated June 7, 1989, and I ask that that statement be included. The time is late, and I will try to confine my comments to the draft of the bill referred to as the Mining Law of 1989.

First, Mr. Chairman, I want to say that I have found just a few technical problems in the bill. The location procedures in the bill should be clear, and in delegating approval authority, the bill should set some clear standards.

I do think that the royalty language in the bill needs a great deal of work. The provisions dealing with existing rights need some study.

My written statement is critical of these provisions, but I must say that Senator Bumpers and the staff have done quite a job in drafting a bill that accomplishes what the Senator seeks to accomplish. It is not the craftsmanship of the bill to which I object, but it is the policy.

The bill repeals a body of law which has governed the mining industry in the United States since even before 1872, by my recollection almost 1848 when we first began to litigate the Treaty of Guadalupe-Hildago. We first then began to get the beginnings of this Mining Law.

This bill discards a 140-year old land tenure system which is predictable, it is certain, and it has been resilient enough to respond to changing attitudes about the environment and to ever-changing critical national needs for lead and zinc in the 1860s, copper in the

1880s, oil and bitumins in the 1890s, molybdenum in 1900, uranium in the 1950s, platinum in the 1980s. And if left alone, this Mining Law of 1872 will provide strategic minerals in the future that we have not even heard of today.

The bill will make mining on public lands extremely unattractive. Because most of the mineral resources in the United States are on these public lands, it will make the U.S. mining industry uncompetitive at the time when the national strategy ought to be to make the U.S. industry more competitive.

This bill virtually eliminates private tenure of mineral lands. It virtually precludes project financing of public lands. The bill adds holding costs, and it adds to the cost of administrative delays, and it lays on what could be a very high production royalty, depending upon how it is to be calculated. All of these costs, and risks, and delays will result in a dramatic deterioration in the ranking of U.S. deposits on public lands in comparison with other deposits in other parts of the world.

I think the bill could discourage foreign investment. We have something of a boom going on in the United States today, led by the gold industry. But that boom is here not because we have high grade deposits in this country, or low labor costs, or low standards of environmental quality.

Senator, I think we have a boom going on in this country because we are regarded around the world as having a safe, and secure, and predictable land tenure system. The bill replaces this self-initiating and privately enforced land tenure system with an administrative process with a lot of hands-on bureaucracy to review and approve economic and technical operating decisions. These tend to be far beyond the expertise of the land management agencies, at least up to now.

And then this bill comes at a time when privatization is the trend around the world, not bureaucracy. Now, here I take issue with some segments of my own industry, but I think the bill encourages speculation, and it does so even in the face of the GAO report that sees perceived abuses of speculation in the General Mining Law. But under the General Mining Law, a locator has no title at all until discovery. Thereafter, the locator must hold his claim against any other locator by the performance of assessment work and by recording with the Bureau of Land Management. The failure to discover minerals or the failure to maintain the claim places the locator at risk of relocation and forfeiture of other locators.

Now, in contrast, the bill does not provide that kind of protection. Under this bill the locator does not have to perform any work, as I read the bill, Senator. It seems to me that in lieu of the work, under the bill, the locators can simply pay the annual holding fee.

Now, that opens the door to speculation at just about the wrong time in the development process. I think we need to have the diligence provided by the private enforcement of other locators in the early going in this process, and the security of title we would like at the development stage where a great deal of money is being put into the ground.

This bill subordinates minerals to nonmineral values and resources. This is not a new issue in public lands management. It was an issue I thought raised under the debates for the Federal Land Policy and Management Act. At that time Congress took some pains to exempt mining claims from that process; and I think that was a sound decision in 1976, and it is a sound decision now.

I think so, because as a practical matter it will be difficult or impossible for exploration claimants to influence the land and resource planning process. One cannot rank mineral values against nonmineral values until one first has had a chance to explore the land. But under the bill, one cannot explore unless mining is already permitted under the land and resource plans.

One of my big problems with the bill, Senator, is one that I know is dear to you, because I have heard a lot about it already this afternoon. The bill eliminates surface titles for mining patents. I think this is a big mistake, and it is a mistake that was made once before.

In the Lode Law of 1866, locators were entitled to patents only to minerals, no surface. Eliminating the surface was demonstrably impractical in those operations in the 1860s and 1870s and was thought to be the bellwether innovation of the General Mining Law in 1872 to include surface.

Well, of course, times have changed since 1872, but miners still need surface in their modern mining operations. They need a modest amount of surface to site facilities, of course, and there can be—the provision under the General Mining Law is pretty modest as it is. Mill sites are only five acres a crack. But in modern mining operations the miners also need to use surface so they can mine by open pit and surface mining methods. These operations are cheaper, and they are much safer, and in many ways they are the only way to attack a deposit.

As I understand it, the bill does not give the right to surface. Instead, it gives a title to minerals, reserving to the government the surface, subject to the miner's right to the reasonable use of the surface required for mining operations.

Well, that language is very much like the language that we saw in the patents issued under the Agricultural Entry Act of 1914 and somewhat like those under the Stock Raising Homestead in 1960. One of the most interesting legal issues in mining law in just the last few years is whether such language, coupled with a reservation of the surface, can be construed by the courts to even include the right to mine by open pit or surface mining methods. So I believe the law could be interpreted as it is now drafted to preclude mining by surface mining methods.

I am short of time, and I think I will just open up for questions.

[The prepared statement of Mr. Alfers follows:]

HEARINGS ON THE GENERAL MINING LAW OF 1872
BEFORE THE
SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT
ENERGY AND NATURAL RESOURCES COMMITTEE
UNITED STATES SENATE

STATEMENT OF STEPHEN D. ALFERS

JUNE 7, 1989

Stephen D. Alfers is a partner in the Denver office of Davis, Graham & Stubbs. Mr. Alfers is a 1976 graduate from the University of Virginia School of Law. He served four years as a U.S. Naval Officer, during which time he completed graduate work and in 1973 received an M.A. in economics from the University of Denver.

Mr. Alfers' practice is concentrated in mining law. Mr. Alfers has served as an adjunct Professor of Mining Law at the University of Denver. He has served as Trustee of the Rocky Mountain Mineral Law Foundation for many years. Mr. Alfers has been active in the Mineral Law Section of the Colorado Bar Association, serving as Chairman from 1983-84.

Mr. Alfers' publications include the following: "Surface Use Agreements," Rights of Access and Surface Use Paper No. 2 (Rocky Mtn. Min. L. Foundation 1984); "The Uranium Royalty Today," 25 Rocky Mtn. Min. L. Inst. 19-1 (1979); "Dumps and Tailings," 23 Rocky Mtn. Min. L. Inst. 171 (1978); and "Accommodation or Preemption? State and Federal Control of Private Coal Lands in Wyoming," 12 Land & Water L. Rev. 73 (1977).

Mr. Chairman, Members of the Subcommittee:

My name is Stephen D. Alfers. I am a Partner in the Denver office of the law firm of Davis, Graham & Stubbs. I am a mining lawyer and I have made my career representing landowners and mining companies acquiring and developing mineral properties on public and private lands in the United States. I am appearing today in response to your invitation to present testimony which I received by telephone on June 2, 1989. This hearing today concerns repeal of the Act of May 10, 1872, as amended, known as the General Mining Law of 1872. I have reviewed a draft of the bill referred to as the Mining Law of 1989 and it is to this draft that I address my comments.

OVERVIEW

The bill would have a devastating impact on the U.S. mining industry. I oppose it for the following reasons.

1. The bill encourages holding public land for speculation.

2. The bill subordinates minerals to non-mineral values and resources.

3. The bill eliminates security of land tenure necessary for mining operations.

4. The bill precludes project financing of operations on public lands.

5. The bill eliminates surface title from mining patents.

6. The bill makes domestic mining uncompetitive against foreign operations.

7. The bill discourages direct foreign investment in mining operations on public lands.

8. The bill replaces a self-initiating, self-executing and self-enforcing land tenure system with a rigid, inefficient, and impractical administrative scheme.

9. The bill impairs rights of existing claim owners.

STATEMENT

Mr. David Delcour is appearing today on behalf of the American Mining Congress. I have seen Mr. Delcour's written statement. His position and that of the American Mining Congress is essentially that the existing mining law meets the four public policy imperatives essential to meeting the national need for mineral resources consistent with our national environmental policy. Mr. Delcour's position is sound. I endorse it, and there is no need to repeat or embellish it here.

I. ACCESS AND TENURE

Any sound minerals and public lands policy must provide a secure, predictable and reliable land tenure system. This is so, because minerals are elusive and risky to develop. First, a sound policy must provide free and non-exclusive access to mineral lands. Second, it must discourage holding lands for speculation. Third, it must provide secure land tenure to support the very substantial development and costs of conducting mining operations. Finally, it must do all of the above consistent with national imperatives for multiple use of public lands and environmental quality. The General Mining Law of 1872 evolved from the customs of miners, against a backdrop of disappointing legislative experiences with disposal of mineral lands by sale or leasing.

The General Mining Law has demonstrated great resilience. With much litigation and administrative efforts -- but little legislative amendment -- the General Mining Law has accommodated the discovery and development of new mineral resources necessary for an industrial society. As technology changed and the nation's values evolved, so changed the mining law. Today the General Mining Laws of 1872 meet all of the objectives of a sound minerals and public lands policy. The bill, however, in its sweeping repeal of existing law, does not provide adequate access and land tenure.

1. Limitation on Access to Public Lands. The bill is limited to "locatable lands," not public lands, and thus denies access to important categories of land even for casual prospecting. Section 202(a). These lands should not be excluded from the resource base.

2. Limitation on Minerals. The bill limits access to "hardrock minerals," a defined term. Just as copper, molybdenum, uranium, platinoids, rare earths, and strategic minerals were unheard of in 1872, the future holds discovery of other valuable minerals we cannot identify today. The public lands should be open to all valuable minerals.

3. Limitation on Exploration. The validity of an Exploration Claim under the bill rests almost immediately upon the Secretary's discretion to approve or disapprove an exploration plan. That exploration plan under the bill must be consistent with "applicable land use plans." Section 202(d)(1). Section 303 directs the Secretary to review and amend or to establish land and resource management plans pursuant to

Section 202 of FLPMA. The bill thus not only affords no priority to mining on these "locatable lands," it seems to ensure or at least encourage prohibitions against mining in favor of "non-mineral values and resources." Section 303.

As a practical matter, it will be difficult -- in many cases impossible -- for exploration claimants to influence the land and resources planning process. One cannot rank mineral values against non-mineral values until one first has had a chance to explore the land. But under this bill, one cannot explore unless mining is already permitted by the land and resource plan.

4. Two-tiered Mining Claims. The bill does not ensure that the claimant will have the necessary rights to develop claims diligently, because the development scheme established in the bill is too rigid and impractical. The bill provides for two types of "claims." The first is an exploration claim which might be used only for "exploration" and not development or mining. Section 202(d), (e). The second is a mineral patent to which the locator is entitled upon the Secretary's determination, first, that the claim contains a "substantial hard rock mineral deposit capable of commercial development" and, second, that the locator has filed an approved mining and reclamation plan which conforms to applicable land and resource management plans. The patent application must

include a mining and reclamation plan which itself must include detailed economic and engineering data, design, development, facilities and plant construction, and production schedules.

There is serious doubt that the limited exploration privileges which accompany an exploration claim would even permit the late-stage development work necessary to generate data to support a mining and reclamation plan meeting the standards of Section 203(f). Once the miner has obtained his patent, he is obliged to carry out operations in strict conformity with the approved reclamation plans, unless he obtains an approved modification of the plan. The statute imposes no standards upon which the Secretary may approve or disapprove a request for a modification of the plan. The scheme makes it extremely difficult for miners to modulate mining rates and sizing of facilities to accommodate market conditions.

5. Tenure of Title. The bill manages to increase the risk of speculation while at the same time seriously reduces the security of title necessary to develop and mine. Under existing law, a prospector's title under pedis possessio is tenuous. That is as it should be. By conditioning title on discovery, the existing mining law discourages speculators from holding large blocks of land without the discovery of mineral sufficient to support a valid mining claim. At the same time,

existing law provides a miner secure title under mineral patents. That, too, is as it should be. Modern mining operations sometimes require investment of hundreds of millions of dollars. Security of title is absolutely necessary, first, to abate the miner's equity risk and, second, to collateralize the necessary financing. Existing mining law thwarts speculation in the prospecting and exploration stages while affording security of title in the development and mining stages. However, the bill turns those two objectives exactly the wrong way around.

Under the bill, the title, if I might use that phrase, to an exploration claim is far more secure than pedis possessio under existing law. On the other hand it is far less secure than that of a valid unpatented mining claim with a discovery of a valuable mineral deposit. Accordingly, the bill allows claimants to hold lands without any discovery of minerals for as long as ten years simply by paying the holding costs. The existing law could never be similarly used for speculation.

At the same time, the bill seems to impose greater risks to good faith miners who have discovered minerals. Under existing law, a locator of a valid mining claim has title against the world, subject only to paramount title of the United States. Any mortgage banker or title lawyer will agree that title in unpatented mining claims is relatively shaky. But these "claims" and "patents" contemplated under the bill are even less secure than unpatented claims under the General Mining Law of 1872. Exploration claims may be deemed null and void upon any number of determinations by the Secretary. For example, if an exploration plan is rejected under Section 202(d)(1), or if an exploration claim is used for any purpose other than "exploration," the claim may be deemed null and void. If the Secretary determines that qualified labor has not been performed under Section 204(e), or, upon failure to submit a patent application within 10 years, an exploration claim is void. Section 203(b). An industry which has experienced nearly a decade of litigation over the Secretary's rather limited power to declare claims abandoned and void under Section 314 of FLPMA must take very seriously the risks provided by reposing in the Secretary these four opportunities under the statute to declare exploration claims null and void.

Under existing law, a miner can carry out mining operations on unpatented claims, under, of course, the full scrutiny of the Secretaries of Interior or Agriculture. However, under the existing law, a miner can apply for a patent, and upon receipt of the patent, the patented lands pass from the control of the United States. Patented lands are private lands, and their title is secure against the United States, except for certain permitted attacks against the patents for fraud or mistake. Mining companies today prefer good title to justify the risks of the business. However, they must have good and marketable title to finance and to site processing facilities, which require the huge investments prevalent in mining operations today.

The bill eliminates patents like those issued under existing law. Under the bill, a miner must obtain a Section 203 patent even before commencing development operations. The requirements for a patent are onerous, and property rights which come with the Section 203 patent are not sufficient, either to collateralize financings necessary to modern mining or to justify the considerable risks of mining operations.

6. Surface Title. Development, construction, and operation of mines in the United States today often require investments of hundreds of millions of dollars. Yet at the very stage of development requiring the greatest security of land tenure, the bill provides very little. A patent under the bill carries with it no title to the surface.

Under the General Mining Law of 1872 a mineral patent carries title to the surface. The legislative history of the General Mining Law of 1872 reveals that one of the principal features of the 1872 law was to include the surface, meeting one of the inadequacies of the 1866 Lode Law. That failed experience under the 1866 Lode Law ought not be forgotten.

The Section 203 patent carries with it no right to the surface. Instead, it amounts to a conveyance of a determinable fee estate in the severed minerals only. Under Section 203(d), the United States reserves the surface, subject only to the limited right to the use of "so much of the surface of the exploration claim as may be reasonably necessary for mining purposes, subject to such reasonable regulations as the Secretary, or, for National Forest lands, the Secretary of the Agriculture, may prescribe. . . ." Mining often must be by open pit or other surface mining methods. The bill offers no assurance of the miners' right to mine by such methods.

7. Financing. Development of modern mining operations in the United States involves a wide array of transactions, including partnerships, joint ventures, mortgages, credit facilities, gold loans or other commodity-based transactions, sales of securities, and perhaps other transactions. All of these transactions require either title or a security interest in the minerals and the surface facilities, as well as the production from the mineral deposit. The miner's title under the bill contains too few sticks in the bundle, and they are bound too loosely. The Section 202 claim and the Section 203 patent contemplated in the bill are so tenuous that

they cannot meet title standards of the transactions with which I am familiar. The bill raises the question whether mining operations on public lands could be financed at all.

8. Use of Non-Mineral Lands. The bill replaces the system for the granting of millsite patents under the General Mining Law for the patenting of non-mineral lands for purposes ancillary to mining operations with Section 205 of the bill. Such non-mineral lands are often used to site capital intensive processing facilities. These facilities require great security of title. Under the bill, upon a proper showing a miner may obtain a special use permit upon terms which the Secretary may prescribe. Under Section 205, the miner does not have the clear right to non-mineral lands and the bill leaves open the price the Secretary can exact for the use of these lands.

II. ECONOMIC CONSIDERATIONS

Mineral products, especially metals, tend to be sold in world markets. Accordingly, the United States mining industry is especially affected by the emerging global economy. For gold, perhaps, this has always been so. Silver, the palladium group minerals, copper and other base metals, now must compete with projects around the world for a piece of the world market. Even in the cases of coal, uranium, barite, and industrial minerals, there are instances of U.S. production being displaced in its own markets by imports from abroad.

If the U.S. mining industry is to remain viable, minerals must be produced here at a cost competitive with deposits around the world. Our mineral deposits here, with a few exceptions, are not notably high grade. Our labor costs are among the highest in the world. The environmental standards for mining and mineral processing lead the world, and environmental costs internalized to mining operations are already among the highest in the world.

Yet in the United States today, we are enjoying something of a boom in the mining industry, led by the gold industry. That boom has been financed to a large extent by foreign investment. Investment in the U.S. mining industry seems attractive today, not because of the presence in the United States of high grade and low cost deposits, but because mining investments in the United States have been perceived around the world as safe. They have been safe here, because the rules of access to minerals on public lands and mining titles are relatively secure, and because the United States government, the greatest proprietor of mineral resources in the country, is perceived as a trustworthy and reliable landlord. The bill threatens the competitive position of mineral deposits on public lands, and because the public lands store the vast majority of our mineral resources, the bill threatens the competitiveness of the entire United States mining industry.

The bill restricts our mineral resource base, by restricting access to all public lands and by closing important classifications of public lands to mineral location. The bill increases dramatically the holding costs for mining resources on public lands, increases production costs from deposits on public lands, and establishes a maze of administrative notices and approvals, each of which raises new practical risks of a catastrophic loss of title and investment.

1. Increased Holding Costs. The bill imposes exorbitant recording fees, a holding fee, annual labor obligations/payments, unspecified surface use fees for mineral patents, amounting to at least a tenfold increase in the holding cost of a single mining claim. The bill imposes bonding requirements which promise to be exorbitantly expensive, if available at all.

Exploration, of course, is always very risky. Under this bill, it becomes also very, very expensive. I believe this bill will eliminate from the industry the junior mining and exploration company, who, while traditionally willing to take the risks, lack the cash to stand these holding costs, leaving only the established mining companies who, while in a better position to absorb these new holding costs, are historically risk averse.

2. Increased Production Costs. Under the bill, in the production phase of operations, the additional holding costs discussed above continue to be a factor.

3. Administrative Delays. Under the bill, the notice to prospect or the location of an exploration claim provide no possessory rights whatsoever. Any real right to conduct exploration on these exploration claims awaits administrative approval of an exploration plan which in turn awaits administrative approval of land use and resource plans. Each year, the bill contemplates determinations by the Secretary to determine whether the annual labor was properly performed. The claimant must secure and file with the Secretary a bond to secure the performance of obligations under the claim. The claimant has no right to develop or mine any public lands without first applying for patent, and the patent application must await approval of a detailed mining and reclamation plan which once again must await approval of land use and resource plans. Under the bill, the claimant is not entitled to surface rights and each miner must convince the Secretary that any surface disturbance is a "reasonable use of surface or patented lands." Such disturbance often requires the destruction of the surface by open pit or other surface mining methods.

The introduction of these new points of decision by the Secretary and new opportunities for rulemaking mean for the miner administrative delay and litigation. At the very least, delay means cost. I believe delay also means that hardrock mining on public lands may become unnecessarily cumbersome, impractical, risky, and uneconomic when compared to mining on private lands or abroad.

4. Royalty. Section 203(d) of the bill reserves to the United States ". . . an overriding royalty of 8 per centum of the value of hardrock mineral production."[1] The term "value of hardrock mineral production" has no meaning in the mining industry. Accordingly, it is impossible to evaluate the economic impact of imposing the royalty as described in Section 203(d).

The bill gives no clue about just where the value is to be measured. Is it the value of the minerals in the ground? At mine mouth? Is it the value of mineral production after treatment or prior to sale? Is it the proceeds of sale of the production? Is it the net profit from the project that generated the production? The economic consequences of imposing a new royalty vary substantially depending upon the point at which this value is to be measured.

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[1] The bill refers to this reserved royalty as an "overriding royalty." Reserved as it is out of the fee, the royalty contemplated by Section 203(d) is clearly not an overriding royalty. The royalty described there is closer to what is known in the minerals industry as a "landowners royalty." However, because the royalty is reserved to the title of the sovereign, the term "royalty" without any adjective is more artful.

If this "value" is to be gross proceeds of production, then 8% is far too high. If "value" is to be net profits, then 8% may be reasonable.

Of course, one can debate the propriety of any royalty at all on our hardrock minerals. The public interest is served in many ways by a viable mining industry. The mining industry generates wealth, jobs, raw materials for the products we consume, severance taxes for our states and local governments, and income taxes for the state and national treasuries. Somehow, I think that's enough.

The argument most often advanced for imposing a royalty on the production from mining claims is general revenue to the public. In the event that a royalty must be imposed on mining claims, the Congress should determine a method of calculation and payment of the royalty. Once the committee determines how to calculate and pay the royalty, it should study the revenue generating impact of the royalty net of the loss of production from the elimination of the marginal production by the higher production costs generated by this bill.

III. TAKING ISSUE

The bill not only would radically change miner's ability to develop new properties, it would substantially impair the rights of existing claimholders. Section 502 of the Bill requires existing claimholders to either relocate their claims under the new scheme or be subject to a fifty fold increase in the diligence requirement. This part of the Bill raises substantial constitutional questions, particularly the Fifth Amendment's prohibition against taking private property without just compensation.

In United States v. Locke, 471 U.S. 84, 107 (1985), the Supreme Court recognized that existing unpatented mining claims could be subjected to "reasonable regulatory restrictions" imposed subsequent to obtaining these claims without constituting a taking. In Locke, there was no taking because the subsequently imposed regulatory requirement was reasonable and imposed only a "minimal burden." By contrast, the Bill would radically condition existing property rights: claimholders will either relocate and forfeit virtually all of the security they presently enjoy, or they will be subject to extremely more onerous assessment requirements. In either case, claimholders will have much less than they have today. Such radical conditioning of vested rights is inconsistent not only with Locke but with the holdings of a trilogy of recent Supreme Court decisions.

CONCLUSION

I want to thank you for inviting my participation in today's hearing and I want to assure you of my willingness and availability to pursue these issues with the Committee and its staff in the future.

We find most of our nation's mineral wealth in public lands. To no small extent, this store of wealth is what has made this an industrial nation. Mining underpins our industrial might. But to remain strong, we must husband these mineral resources carefully, and we must be able to develop these minerals efficiently.

Proponents of the bill charge certain abuses of the mining law and put up this measure as a remedy for those alleged abuses. Adequate remedies for all of the perceived abuses can either be found in existing law, or can be provided by improved enforcement of the existing law. The bill goes far beyond the perceived abuses of the mining law. It is sweeping legislation which will reshape the entire mining industry. There already has been a great deal of discussion of these alleged abuses. The General Accounting Office has issued reports calling for revision. The American Mining Congress has submitted a rebuttal to the GAO report. Accordingly, this statement addresses the bill.

The bill is a dramatic departure from existing law and policy. The bill would repeal the Mining Law and replace it with an entirely new land tenure system. It is far more sweeping than is necessary to address perceived abuses of existing law. This bill would have an enormous economic and strategic impact. It needs additional study of the economic impact, and I want to endorse the American Mining Congress in its request for additional hearings on the bill, especially field hearings in the public lands states.

Senator **Bumpers**. Mr. Alfers, let us hear from Mr. Leshy first.

STATEMENT OF JOHN D. LESHY, PROFESSOR OF LAW, ARIZONA STATE UNIVERSITY

Mr. **Leshy**. Thank you very much, Mr. Chairman, and Senator. In view of the hour I will be very brief.

The mining law—I think we have heard a lot today about how the mining law is an obstacle as far as protecting other values of the federal lands are concerned.

We have heard a little bit, but probably not enough about how the mining law is an obstacle to efficient exploration and development.

The dialogue with Senator McClure that took place a few moments ago, I think, gets at some of that.

There is an awful lot of red tape. I take great issue with Mr. Alfers' characterization of the law that has developed under the mining laws being predictable and certain. I think it is, frankly, anything but that.

And there is a risk here when we talk about reforming the mining law of carrying all of that 117 years of baggage with it into a new reform act.

It comes up in the question of grandfathering existing claims. It also comes up when we talk about a discovery concept, such as in your proposal.

I could not help thinking when Congressman Craig trotted out the 15 foot chart of decision points under the mining law, I am serving on an oil and gas, on-shore oil and gas leasing committee set up by the reform act a couple of years ago for the National Academy of Sciences.

We are working with a flow chart under that law that is about a foot long. Instead of 15 feet I think you could then go, that suggests you could go to an oil and gas type of reform act for the mining law, and save 14 feet of decision points.

I say that only half in jest, because there is always a risk when you tinker with the law. And the mining law has been tinkered with a good deal over the last 117 years. There is always a risk when you tinker with it that you are going to carry into the reforms all of the baggage of the old law, such as discovery which has been litigated probably 5,000 times over the last 117 years, what it means.

When you incorporate a discovery concept into a new law, you may create some of the same problems and uncertainties and difficulties.

Let me talk briefly about some environmental issues. Mining will never be a clean industry, but the industry's track record, by and large, is improving. I think that, without question, everybody who has looked at a modern, successful, profitable mining operation, the mining industry, by and large, has tended to do a pretty good job from an environmental standpoint, although it is not uniform.

The marginal operations, most local, BLM in force, and people will tell you, the economically marginal operations are the ones that cause the greatest environmental difficulty.

And in that sense it is really silly, I think, for the BLM to have this discretionary bonding policy that has created the problems that we have heard a lot of talk about.

We are now seeing in the West in lots of places, tremendous cleanup costs being incurred from the past mining operations. The Super Fund law, for example, is being used in many places to require the expenditure of millions and millions of dollars to clean up these problems.

The United States government, by the way, runs a substantial risk of being a responsible party under the Super Fund law for unpatented mining claims, because it still holds title to the land. And that, by the way, is one great difficulty I have with Senator McClure's idea about a reversionary clause.

That is, if the government gets the land back, after the mining is complete, I would think the industry would like nothing better than to give the land back to the government if it has got a potential liability problems on up from the standpoint of cleanup.

That is one problem I have with the reversionary idea. The other problem is, I think it is practically impossible to enforce when you have somebody who wants to put the second home subdivision in, or make some other non-mining use of the land.

We have experience with that under the so-called RPP Act, Recreation and Public Purposes Act, which has exactly that kind of reversionary clause.

The United States gives land to local, state and local governments, so long as it is used for certain kinds of public purposes. If it is ever not used for those purposes, the United States gets the land back.

When I worked in the Department of the Interior several years ago, we asked around about whether that had ever been enforced, and the answer was, somebody remembered, possibly once, in 50 years of administering this law, had the United States ever taken land back. Because it had no staff, or no interest in investigating whether or not the land was used for non-mining purposes.

And that gets at one other issue I wanted to address, especially when we are talking, and you have heard a fair amount about abuse of the law, can you put a second home subdivision on a mining claim, or a group of mining claims?

The answer is, of course, no, it is illegal and it has always been illegal. It has been illegal for a 100 years. There are cases going back that far.

The problem is not whether it is legal or not. The problem is, is there a satisfactory process available for policing and for enforcing those existing legal requirements?

And the answer is clearly, of course, that there is not a process for doing that.

The substantial cases we have seen of 30 years of litigation to get somebody to get off a mining claim that they were using for a non-mining purpose. There are plenty of examples of that.

I must say I was a little bit surprised at all the criticism GAO has gotten today. If the GAO report had been an isolated example of somebody taking a look at the mining law and finding some abuse under it, perhaps, I think, the criticism would be justified.

But the GAO report has lots of people familiar with the practice under the mining law. A no is simply one of a very, very long line of such reports that evolved from this committee, from the federal agencies, from the prior GAO administrations, from outside agencies that have all found the same things, basically.

The mining law is subject to an awful lot of abuse and nobody has ever found out, or found or discovered a way to deal with that abuse effectively.

I think I will stop there. Thank you.

[The prepared statement of Mr. Leshy follows:]

Statement of John D. Leshy
Before the
Subcommittee on Mineral Resources Development and Production
# of the
Committee on Energy and Natural Resources
United States Senate
on the Proposed Mining Law of 1989
June 7, 1989

Mr. Chairman, members of the Committee: My name is John D. Leshy. I have for nine years been Professor of Law at Arizona State University in Tempe, Arizona. Prior to that, I spent about 3 1/2 years as Associate Solicitor for Energy and Resources in the Department of the Interior, and nearly five years in the Western Office of the Natural Resources Defense Council. I am testifying today on my own behalf, by Committee invitation, and also on behalf of the Grand Canyon Trust, on whose Board I serve. The Trust is a regional conservation organization dedicated to preservation and wise management of the Grand Canyon and other public lands on the Colorado Plateau. It has been monitoring the uranium mining activities taking place under the Mining Law on the periphery of the Grand Canyon National Park, and is concerned about hardrock mining throughout the Colorado Plateau.

I have observed the operation of the Mining Law of 1872 for some seventeen years. In January 1987, Resources for the Future here in Washington published my book on the subject, titled The Mining Law: A Study in Perpetual Motion. Both a history and a modern assessment of that colorful law, it described in detail the major problems that most knowledgeable observers agree exist with this Law, including the following:

-- It provides little protection or security of tenure to explorationists;

-- Its archaic provisions unnecessarily enmesh mineral activity in red tape and technical legal obstacles;

-- Its open access and privatization features, coupled with its cumbersome administrative enforcement process, invite its abuse for ends that have nothing to do with mining;

-- Its lack of a rental, royalty, or any other direct payment to federal or state governments subsidizes mining at the expense of other uses of federal land; and

-- While it has been rather haphazardly modified by more modern laws to permit some regulation to protect the environment, it is still administered in a way that pays insufficient attention to environmental values.

In short, the Mining Law is (and has been for several decades) an obstacle to efficient exploration and development of federal minerals. At the same time, it is an obstacle to the protection of the many other values served by the federal lands. As written and currently administered, in other words, it serves no one's interest. Rather, it is a national embarrassment, out of touch with both modern hardrock mineral development imperatives and modern resource management principles. (I elaborated on these problems in my testimony to a subcommittee of the House Interior Committee two years ago. I have appended a copy of that statement to this testimony, and request that it be included in the record of this hearing.)

I am pleased to have the opportunity to testify today, and delighted by the interest of this Committee, and especially Senator Bumpers, in taking up the task of reforming this antique. Securing passage of legislation curing the defects illuminated by nearly six score years of practice under the old Law is an important task. The Western landscape is increasingly littered with environmental and management problems caused by the use, and even more frequently the abuse, of the Mining Law.

Reform is also a challenge, in part because the Law is regarded as the equivalent of sacred scripture by a comparatively few, but extremely ardent, spiritual descendants of the gritty prospectors that helped pave the way for Western settlement. It is also challenging because in modern times the debate over the Law's future has tended to be couched in extremist rhetoric - as a choice between unrestricted emphasis on hardrock mineral development or no hardrock mining at all.

As you have recognized, the time is ripe for statesmen to slice through that rhetoric, and to fashion reforms to bring the Law into conformity with both modern mining practice and modern environmental values. The proposed Mining Law of 1989 is an important step in advancing the debate beyond what might be called the "ground-pawing and snorting" stage, to begin to talk specifically, and realistically, about reforms.

In what follows, I offer some suggestions for improving this bill.

A. Preserving Self-Initiation and the Claim-Patent Framework is a Significant Concession to the Hardrock Mining Industry:

This bill's title, the "Mining Law of 1989," is apt. It preserves the essential framework of the Mining Law of 1872. Hardrock miners would retain the right to enter most federal lands to prospect and locate claims only with notice (section 201), and without the need for advance permission from the federal land manager.

The proposal is not, in other words, to create a purely discretionary leasing system such as is already followed by the federal government for hardrock mineral development on acquired federal lands and on the Outer Continental Shelf, and for fossil fuel and fertilizer minerals on all federal lands; already followed by state governments for mineral development on all their lands; already followed by private mineral owners; and followed by most other countries around the globe.

I have no fundamental objection to a location system in principle. A pure leasing system does, in my judgment, offer a cleaner opportunity to take into account those other values offered in abundance by the federal lands. But I believe it is possible for a carefully designed location system to do so as well. This bill is a good start in that direction, although it could be improved.

The notion is abroad that retaining the self-initiation location system may be the only feasible way to achieve meaningful reform of the Mining Law. That bit of "conventional wisdom" - a term defined by John Kenneth Galbraith as "what everyone believes to be true, whether it is or not" - should not be permitted to obscure the fact that retaining that framework is a significant concession to the hardrock mining industry. It preserves a special opportunity on federal lands that industry - an increasingly global one - lacks almost everywhere else in the world.

The preservation of that system ought to color how the Congress approaches the details of this bill. Specifically, by beginning with a very important concession to the industry, the Congress ought to be cautious about yielding further ground, to avoid undermining the very purpose of reform.

B. The Location System for "Uncommon Varieties" of Widely Occurring Substances Ought to be Abolished:

The bill generally leaves the coverage of existing law intact, defining "hardrock minerals" as those subject to location under existing law. (Section 102(e)) The net effect is to perpetuate one of the most significant sources of abuse of existing law, and one of the biggest headaches for federal land managers and users, and owners of adjacent land. Specifically, in 1955 Congress finally removed ordinary sand, gravel, limestone, and other common minerals from the Mining Law, but left subject to that Law so-called "uncommon varieties" of these substances.

As might be expected, disputes over the scope of this exception have been chronic since 1955. These substances are found throughout the federal lands. Whether a particular deposit (or part of a deposit) is a "common" or an "uncommon" variety is nearly always open to argument. As a result, the widespread abuses resulting from the use of the Mining Law for non-mineral ends (such as marijuana cultivation, weekend retreats, gaining exclusive access to trout streams and the like) are made much harder to combat. Current law hands abusers a convenient argument with which to thwart government attempts to stop the abuse, and can even give the claimant outright title to federal land for a pittance, when that land is far more valuable for other uses.

Even conceding that an "uncommon variety" of these common substances can be determined with some precision, none of them can be described as minerals with strategic or other national significance. In sum, there is every reason to use this bill to close that loophole, and make all varieties of these common substances henceforth subject, like "common" varieties now are, to discretionary sale.

C. The Bill's Techniques for Dealing With Abuse of the Mining Law Need Tightening:

While I am on the subject of abusing the Mining Law for non-mineral ends, the bill does make a salutary effort to restrict the opportunity for abuse, principally by simply prohibiting the use of exploration claims (section 202(e)) or mineral patents (section 203(e)) from being used "for any purpose other than" exploration, mining, processing, or "uses reasonably incident to mining or processing." These sections also establish penalties of up to $1000 per day and forfeiture of the claim or patent.

As tough as these sanctions seem, they are insufficient. Existing law in theory already provides similar protection (except for a direct monetary fine), yet the administrative mechanism for dealing with such abuses has proved so cumbersome as to be nearly useless. Nearly a century of practice has demonstrated that claimant-abusers will pursue every opportunity to hamstring reasonable efforts to enforce the law.

I have several suggestions for improvement, to deal with the serious (and rapidly growing, in some parts of the West) problem of abuse. First, the bill ought to provide expressly that persons abusing the Law for any non-mining purpose are liable for all costs of restoring the land in question to its pre-abuse condition, including removal of structures and trash.

Second, the bill ought to contain a flat prohibition on residential occupancy of any structure on an exploration claim or a patent, except insofar as such occupancy has been specifically approved by the land managing agency as part of an exploration or mining and reclamation plan. Under current law (and under the proposed bill as I read it), the burden is on the government first to show that the residential occupancy is not "reasonably incident" to mining activity - a standard that invites abusers to bulldoze some land to provide a mining "cover" for their occupancy, needlessly scarring the land, and complicating the government's enforcement effort.

There is no need to erect and occupy a structure at any stage of mining activity unless the prospector/miner intends to engage in enough surface disturbance to trigger the requirement to submit and secure approval of an exploration or mining and reclamation plan. Therefore a flat prohibition on residential occupancy except as part of an approved plan is reasonable, and would significantly simplify the government's task in combating abuse. Instead of arguing over what is "reasonably incident" to mining, the government would need only show the occupier has no approved plan.

Third, tragedies have occurred because squatter-abusers on the federal lands under cover of the Mining Law live in unsafe structures that do not conform to health and safety codes. I note that the bill already provides that mining and reclamation plans (section 203(f)(11)) must show "the manner of compliance with . . . State and local laws and regulations," but the bill is less clear with respect to exploration (see section 202(d)(1), referring to "all applicable laws"). To make the matter absolutely clear, and to head off more tragedy, I recommend that this part of the bill be amended specifically to require that all structures on mining claims must comply with all state and local health and safety codes.

D. The Regulatory Authority of State and Local Governments Could Be Clarified:

As I read the bill, it would probably be interpreted as preserving substantial authority in state and local governments to regulate operations on mining claims for environmental protection purposes. Nevertheless, it could be made more clear.

For example, as I noted earlier, section 202(d)(1) requires the Secretary to determine that exploration can "be conducted in accordance with all applicable laws and applicable land use plans." Section 301, the reclamation section, speaks of compliance with "all applicable Federal and state laws and applicable land and resource management plans." Section 302, the bonding section, speaks of "all applicable laws and regulations."

I presume that such "applicable" laws include those non-federal laws that can be enforced against Mining Law activities under current law, as explained by the Supreme Court in its recent decision in California Coastal Comm'n v. Granite Rock Co., 480 U.S. 572 (1987). These would be state and probably local environmental regulatory laws and standards, but not state or local land use plans.

Section 203(f)(11), dealing with mining and reclamation plans, is somewhat different. It requires such plans to show "the manner of compliance with Federal, State, and local laws and regulations." It is not completely clear what a showing of "the manner of compliance" would entail. Does this, for example, preserve state and local authority unilaterally to enforce their environmental regulatory laws, something current law already provides, as the Granite Rock decision makes clear?

In my judgment state and local authority to regulate to protect the environment ought to be preserved by this bill, at the exploration as well as the development stage. If the citizens of Idaho, for example, adopt reclamation standards for mineral activities in their state that are more stringent than federal standards, Idaho ought to be able to apply them to hardrock mining operations on federal land. This is currently the situation under not only the Mining Law, but practically all other federal environmental laws as well.

This approach is not only standard practice; it makes sense. These state and local governments are most immediately affected by the environmental impacts of mining activities. Therefore they ought to be able to enforce higher environmental standards if they choose, independent of federal standards or enforcement.

Finally on this subject, the bill would explicitly "supersede any conflicting state location and filing requirements" with a uniform federal law (section 202(b)). Preempting non-federal laws on location and filing requirements makes a lot of sense by eliminating unnecessary red tape. The bill ought, however, to make clear that this also preempts state or local laws requiring or encouraging the digging of useless so-called "discovery" pits and the like.

E. The Respective Roles of the Pertinent Federal Agencies Need Clarification:

The bill is not completely clear on how regulatory authority over mining operations will be allocated at the federal level. Section 102(o) defines "Secretary" as the "Secretary of the Interior." Sometimes the bill speaks only of the Secretary, while other times it speaks of the "Secretary or, for National Forest lands, the Secretary of Agriculture."

I could discern no entirely consistent pattern of choice between these two approaches. For example, sections 202 and 203 give the Forest Service authority over exploration and mining/reclamation plans on the national forests, while section 205 apparently gives the Secretary of the Interior authority to allow the use of other national forest land in connection with the same operations.

The distinct trend in modern times is for each land management agency to assume general regulatory authority over all activities on the lands it manages. This provides for simpler, more streamlined administration, and a better balancing of the different uses these lands serve.

It should be recalled that more than the Forest Service and the Bureau of Land Management are involved here. There are still thousands of mining claims in units of the National Park System and the National Wildlife Refuge System and on lands managed by other federal agencies like the Bureau of Reclamation and the Corps of Engineers. Such claims were for the most part located before these agencies assumed management responsibility, and have been maintained ever since. These agencies plainly deserve to have primary responsibility for regulating activities on these claims.

I can think of no good reasons to depart from the modern trend here. The bill ought to provide that the agency managing the land surface ought to have the authority to receive, review, and act upon exploration and mining and reclamation plans and all other aspects of the operation that involve uses of the lands the agency manages.

Finally, although the question is somewhat closer, consideration ought to be given to vesting the surface managing agency with responsibility to issue mineral patents under section 203(a) and (b), a matter the bill as I read it leaves to the Secretary of the Interior on all federal land, including national forests. I would also leave to the surface managing agencies the authority to adopt regulations for claim location, another matter the bill apparently leaves exclusively to the Secretary of the Interior (section 202).

I would, in short, give each surface managing agency full authority to implement this Law on its own lands. The bill might exhort the agencies to make their regulations as consistent with each other as possible, but the final judgment over the national forests, for example, should be that of the Forest Service.

F. The Retention of a Discovery Standard Ought to be Reconsidered or Clarified; As Written It May Create More Problems Than it Solves:

As I read the bill, it contains a concept something like a "discovery" standard for receiving a mineral patent. That is, section 203(c)(1) establishes, as a threshold requirement for a patent, that the claim or claims "contain a substantial hardrock mineral deposit capable of commercial development."

The purposes behind such a requirement are not immediately apparent. Presumably people will not want to go to the trouble of submitting a patent application, along with the mining and reclamation plan required by section 203(c)(2), unless they believe they can develop the deposit at a profit. The trend in mineral law (other than the Mining Law) is away from involving the government in such economic viability determinations except where absolutely necessary, and instead to rely on the mineral markets to signal viability.

Perhaps the intent in including this provision is to provide a tool against abusing the Law for non-mineral ends, by giving the government the right to deny a patent when it doubts the good faith of the applicant. While this is a worthy objective, it is probably best achieved by direct prohibition of abuse and vigorous enforcement, rather than an indirect approach that could involve the government in a morass of economic appraisal and analysis, and a potentially protracted battle of opinion, such as is now the case with "discovery" contests under current law.

Or perhaps the intent is to give the government the power to protect the environment against needless damage, by rejecting proposals to mine where the government believes the targeted deposit is economically sub-marginal. This is also a worthy objective, and perhaps justifies including at least some notion of profitability. If so, however, the test ought to be made as precise as possible. One red flag here: Any language that allows the inference that the notion of "discovery" under current law is somehow incorporated will simply create more rather than less uncertainty. Therefore the bill ought to make clear that the intent is to repeal and replace the existing much-debated law of "discovery."

Moreover, as now written, section 203(c)(1) is too vague. It could permit oil shale claimants, for example, to argue that oil shale is "capable of commercial development." Even though no oil shale has ever been commercially produced despite nearly one hundred years of effort, the conventional wisdom was (and perhaps still is) that someday oil can be produced from oil shale at a price competitive with other energy sources. (In fact, as this Committee probably knows, the Department of the Interior actually made such a generous interpretation of the law of discovery as applied to oil shale, and was eventually upheld by the U.S. Supreme Court. See Andrus v. Shell Oil Corp., 446 U.S. 657 (1980).)

The possibility that the language "capable of commercial development" is susceptible to a self-defeating interpretation is bolstered by the fact that the bill separately defines "paying quantities" to mean minerals "whi h would pay a profit, if the mine were operated and the minerals marketed." (Section 102(1))

This might be interpreted as requiring a more immediate showing of profitability than "capable of commercial development."

My basic concern is that incorporating some sort of governmental decision on "discovery" might lead to the same kind of morass, productive mainly of conflict and litigation, that is created by the discovery requirement of current law. The standard in the bill ought to be sharpened to avoid this possibility, or otherwise deleted.

G. The Land and Resource Management Planning Provision Is Generally Sound, But Might Benefit from Some Clarification:

Section 303 is a very important part of the bill. It gives the agencies a push to pay more attention to hardrock mining in their land and resource management plans. The agencies are proceeding in this direction anyway, albeit more slowly than many would like. But there are still some who argue that current law does not allow these plans to address hardrock mining. Therefore the bill's clarification is welcome.

The most useful role these plans can play is to identify the other, non-mineral values of specific tracts of federal lands that deserve special consideration and protection against hardrock mining, beyond the generic reclamation standards contained in section 301. The plans should identify not only areas to be totally withdrawn from hardrock mining, but also areas where hardrock mining can take place under special restrictions to protect, for example, riparian zones, critical wildlife habitat, and the like. For example, a plan might contain specific requirements for dredge mining on specified stream reaches to permit better control of the impacts on streams and fisheries caused by marginal, largely recreational suction dredge operations practiced in some parts of the West.

Thousands of mining claims still exist in areas (such as National Parks and wilderness) that have been subsequently withdrawn from the operation of the Mining Law. Activities on these claims in particular will require careful regulation in order to protect the values prompting the withdrawal of the lands. The planning process provides a useful means for crafting such regulations, involving as it does interdisciplinary consideration of competing values and substantial opportunities for participation by the claim-holders, state and local governments, and the general public.

As noted earlier, thousands of mining claims are found on land managed by the National Park Service, Fish and Wildlife Service, and other agencies. These agencies also have established processes for the preparation of resource management plans for the areas under their jurisdiction. Therefore, this section ought to include these agencies as well. This can be accomplished by simply requiring "each agency managing land surface on which mining claims exist" to use their planning processes as described above.

H. Existing Claims Ought to be Made Fully Subject to the Provisions of this Law Within a Short Time:

Section 501 of the bill happily abolishes the surface patenting provision of existing law as of the date of introduction, except for persons who have already met all the requirements for the patent under existing law. If the recent controversy over the oil shale claims settlement is any guide, this provision will prompt an outcry from existing claimants complaining about the "taking" of their "valuable property rights" in existing claims.

As I explained more fully in my testimony to this subcommittee last year on the oil shale claims bill, the "takings" argument is wholly unpersuasive in this context. A mining claimant has no constitutionally protected property right unless his claim is supported by a valid discovery. Even then, the basic property right is a right to mine, so long as he complies with regulations to protect other values. The expectation of a surface patent is not, in other words, a core right under the Mining Law. Therefore it may be repealed without raising any serious constitutional issue, so long as some right to mine is preserved.

The proposed bill does this, and thus fully satisfies constitutional requirements.

Section 502 of the bill gives existing claimants the option of (a) relocating their claims under the bill's new standards and procedures (except with a waiver of annual fees, and a reduction by one-half of the otherwise applicable diligence requirements); or (b) "maintaining" their claims under existing law, as modified in certain respects (principally by increasing the diligent development requirements above those applicable to new claims, and applying the mandatory bonding and reclamation requirements of the new law).

The bill plainly regards option (a) as preferred, by giving existing claimants a financial incentive to choose it, while providing a financial disincentive to choosing option (b). Yet option (b) allows for many of the archaic, uncertain and hapless requirements of existing law to continue indefinitely into the future. While it is clearly better than the course Congress chose in the Mineral Leasing Act, of grandfathering existing claims wholesale, the bullet ought to be bitten and grandfathering in any form ought to be denied.

The opportunity for an election is not constitutionally required. If option (a) were made mandatory, the core right to mine would be preserved under reasonable police power regulations. The

Constitution simply does not, under any reasonable interpretation, disable Congress from make a revision of a law immediately applicable.

There is also no good policy reason to give claimants option (b). In order to provide a prompt conversion to the new law, and to avoid the kind of continuing mess created by the grandfathering of mining claims under the Mineral Leasing Act of 1920, I suggest that section 502 simply provide that holders of existing claims shall be subject to the new law after a short transition period following its enactment.

I. Some Final Specific Suggestions:

A standard enforcement device Congress has used in many regulatory statutes is to prohibit agencies from granting benefits to persons who are out of compliance with applicable law. Most members of the mining industry are responsible citizens, concerned with protecting the environment and complying with applicable laws and regulations. But every barrel has its bad apples, and an ethos prevails among a few miners of fierce resistance to any form of regulation. The government ought not approve exploration or mining and reclamation plans submitted by operators who are not complying with applicable laws and regulations elsewhere on the federal lands.

To the same end, the bill ought to include a "citizen suit" provision such as also has become a common feature of environmental regulatory laws. Such provisions have proved very useful in filling enforcement gaps created by bureaucratic footdragging or policy-grounded hostility to enforcement. The record is also clear that these provisions have not been seriously abused in the nearly two decades they have been standard parts of the regulatory landscape.

Concerning financial provisions, section 401 gives the states 50% of the receipts derived from claimants under the bill. The federal 50% would be deposited in the federal treasury as miscellaneous receipts. A powerful case can be made that a substantial portion of these revenues ought to be devoted specifically to repairing or mitigating the damage from past hardrock mining operations throughout the West. The legacy of these operations lives on, in the form of water polluted by mine drainage and leaching spoils piles, air polluted by winds raking unreclaimed tailings and spoils, and other degraded and even hazardous conditions. It is entirely fitting that an abandoned hardrock mining reclamation fund be created (such as Congress has done for coal), funded by revenues derived under this bill, to repair that damage, or to offset it through purchases of recreational land or wildlife habitat under a program like the Land and Water Conservation Fund or the proposed Heritage Land Trust.

It should be noted, in this connection, that the federal government itself may be liable for these costs, at least where it has retained title to the land. That is, continuing environmental problems with abandoned mining sites on unpatented mining claims create the distinct possibility that the federal government will be found to be a potentially responsible party obligated to pay cleanup costs under the Superfund legislation. That is yet another reason to create a fund to pay for the cost of cleanup and mitigation.

Because this bill proposes that the United States will retain or regain title to the land after mining ceases, the bill might expressly address how potential liability from any long-term hazardous conditions will be allocated between the government and the miner.

Also on financial provisions, section 203(d)'s establishment of a royalty provision ought to make clear that the royalty is to be calculated on the basis of the claimant's gross rather than net revenues. My home state of Arizona is one of the few jurisdictions to apply a mineral royalty on the basis of a miner's net revenues derived from mining operations on state lands, and its experience has been most unhappy. Calculating the royalty on net income gives operators a seemingly irresistible incentive to "load up" costs by creative accounting techniques, to reduce or even wholly avoid royalties on what are in fact profitable operations. As a result, most successful mining operations on Arizona state lands have rarely paid royalties. (Last week, in fact, the United States Supreme Court affirmed an Arizona Supreme Court decision that this situation violated the state's Enabling Act, which obligates the state to get "full value" for any lease of state lands.)

Section 205 of the bill would allow the Secretary to approve the use of additional federal lands to support mineral activities. As noted earlier, this section ought to be amended to give that authority to the federal surface managing agency. The regulatory scheme could also be streamlined by making clear that such uses must be evaluated as part of the exploration or mining and reclamation plan required by sections 202 and 203.

Finally, section 205 ought to make clear that the reclamation requirements of section 301 are mandatory. (A possible interpretation of the use of "may be" on line 12 on p. 14 of the bill is that these requirements are discretionary with the federal agency, not mandatory.)

Section 202 (d)(3) of the bill ought to be reworded to make clear that the federal agencies should approve proposed modifications of an exploration plan only if they comply with the generic standard in section 202(d)(1). (As now worded it is susceptible of the interpretation that approval is mandatory - "shall be approved.")

The provisions on temporary cessation of mineral production also could be clarified. The standard in section 203(d) allows such cessation for a "reasonable amount of time if market conditions do not warrant continued extraction," but there is no outside time limit on this. One should be expressed; seven years seems an appropriate figure.

That same section also allows a claimant with an approved mining and reclamation plan and a patent to sit on it for fifteen years without producing anything. That period seems too long. Mining techniques, environmental conditions, general knowledge and values can all change a great deal over such a period, rendering an approved mining and reclamation plan increasingly "stale" as time goes by. If an operator has gone to the trouble of preparing and submitting a mining and reclamation plan and securing a patent, it ought to be ready to mine promptly. I would suggest shortening this to no more than 3-5 years; after that, a new or modified plan ought to be submitted.

Section 202(b) requires a claimant to give the federal government notice of "the hardrock mineral or minerals for which the claim is being located." The reason behind such a requirement is not clear to me, and in any event it would probably not produce much helpful information. Claimants are likely to list a wide variety of minerals (many of which are often found in association with each other anyway). I suggest deleting the requirement.

Section 202(a) ought to be rewritten to eliminate any suggestion that claims need be located on the ground, by monumenting or staking. Practically all laws governing interests in real property throughout the civilized world now rely almost exclusively on a recordation system. Any benefit of notice provided by staking or monumenting on the ground is marginal at best, and more likely counterproductive. Such surface indications may be lost or altered, and/or may conflict with the recorded location, giving rise to unnecessary disputes and even litigation.

Conclusion:

The proposed Mining Law of 1989 is a useful beginning in the long overdue effort to reform the Mining Law of 1872. I applaud the efforts of this Committee to date, and offer whatever additional assistance I can provide to move that process along. The mining industry, other users of the federal lands, and the nation will all be better off if reasonable, meaningful reform can be achieved.

Statement of John D. Leshy
Before the
Subcommittee on Mining and Natural Resources
of the Committee on Interior and Insular Affairs
U.S. House of Representatives
Oversight Hearing on the Mining Law of 1872
June 23, 1987

I am delighted to have the opportunity to testify today. The Mining Law is a fascinating piece of Americana, a snapshot of mid-nineteenth century federal lands policymaking growing out of the California gold rush that began in 1848. This statute, sometimes called the King of the Resource Laws, is the last important surviving remnant of that mostly forgotten age. Although it has often been attacked over its 115 year existence, by those inside as well as outside the industry it was supposed to serve, it has never been fundamentally changed.

It has been more than ten years since the Congress last took a serious look at how this law is working. As you may know, I have recently written a book on that subject, called The Mining Law: A Study in Perpetual Motion, published in January of this year by Resources for the Future here in Washington. My testimony today will attempt to highlight the major conclusions that emerged from my several years of investigation into the law's operation.

To summarize, the Mining Law is, and has been for several decades, an obstacle to efficient exploration and development of federal minerals. At the same time, it is an obstacle to the protection of the many other values served by the federal lands. As written and currently enforced, in other words, it serves no one's interest, but rather is a national embarrassment, out of touch with both modern hardrock mineral development imperatives and modern resource management principles.

A congressionally established review commission once observed that in most cases the Mining Law "simply bequeaths a piece of paper and a legal contest. . . . [I]t has a history of the most frequent, vexatious, costly, and damaging litigation." These words were written in 1880, but are still valid today. I would like to recount, briefly, one typical modern legal dispute to illustrate just how unsatisfactory, even hopeless, the Mining Law is as an instrument of mineral development.

An Amax geologist located six lode claims on BLM land in Humboldt County, Nevada in the summer of 1982. Some of these overlapped with claims allegedly located by others previously. Incidentally, both exploration and mining typically require the location and maintenance of numerous mining claims, because the original law, never changed, limits individual claims to a maximum of twenty acres. Naturally, this leads to a lot of red tape and attendant legal pitfalls.

Nothing was done to resolve the overlap until 1984, when Amax relocated its claims -- twice, in fact, once as lode and once as placer claims. This was also prudent, because the statute nonsensically distinguishes between the two types, and if the wrong kind is located, the claims are invalid. Careful operators thus cover their bets by locating both types on the same ground. (But the law has another trick up its sleeve, because if the two types of claim are located in the wrong order, the claimant is deemed to abandon the earlier type by locating the later one.)

Then Amax and two different groups of claimants went to court to sort out their rights. The court found first that there was doubt whether the first group of non-Amax claims (the A&R group) had been located prior to Amax's, because on-the-ground evidence of the A&R locations was lacking. This illustrates another perverse feature of the law - it still relies on notice by physical markings, stakes, natural landmarks and the like, on the ground. The court also found that the earlier-located claims suffered from still another of the technical legal defects with which the Mining Law abounds - the original locators, an association of several persons, had sold their so-called "association" claim to an individual, but the law prevents an individual from taking title in these circumstances. For both these reasons, Amax was deemed the senior locator of these claims.

With respect to the second group of overlapping claims (the Mosher group), however, Amax's numerous technical legal challenges were rejected. But, the question remained, what rights did the senior locators, Amax and the Moshers, have? After untold expenses of location and exploration, and years of litigation and several days of actual trial, the Court held that they each had exactly nothing - no legal rights against the United States, each other, or anyone else. Amax had shown considerable mineralization and some promise of producible ore on some of its claims, but that was not enough, under settled interpretation, to constitute a valid "discovery" of a "valuable mineral deposit." (By the way, the law also requires that a valid discovery be shown on each individual claim, another relic of nineteenth century policy that can cause serious problems, especially on a large, low-grade deposit where economies of scale make the profitable extraction of ore from a single claim infeasible.)

Lacking a discovery on any claim, none of the claimants had any rights against the United States, because a mining claim is not a protected property right unless it is supported by a discovery. (For this reason, whether a discovery exists has been litigated in literally thousands of cases over the past 115 years, but a coherent consensus on the requirements for a discovery has never been attained, and the issue continues to provoke much litigation.)

The court went on to hold that the competing claimants also lacked any protection against each other, or anyone else. Here a little background is necessary. The Mining Law still explicitly requires that "no location of a mining claim shall be made until the discovery of the [mineral] within the limits of the claim." (emphasis added) About 60 years ago, the courts decided to ignore that language, and instead to allow claims to be located in advance of discovery. But, in order to avoid doing even more violence to the statute, and to discourage speculators bent on tying up vast acreages (with good reason, for there have been numerous examples of that abuse of the Mining Law) the courts have generally insisted that a claimant is protected against topfiling by competing claimants only when the original claimant is in active possession and exploration of the claim, by which they mean a continuous physical occupation of each claim. But the most sensible way to go about exploring for minerals with modern methods is usually on an area-wide basis, and from that perspective the requirement of continuous occupation of each individual claim makes no sense. Nevertheless, because neither Amax nor the Moshers had shown that kind of constant presence, they had no protection whatsoever.

The net result of all this hubbub - all this effort spent to locate and litigate these claims - was exactly zero. The court's melancholy conclusion: "The land remains in the public domain open to peaceable exploration by the parties or by any other citizen." Amax Exploration v. Mosher, Civ. R-85-162 BRT (D. Nev., Feb. 27, 1987)(emphasis added).

I've spent some time recounting these facts because this dispute typifies many - though by no means all - of the roadblocks the Mining Law throws in the path of legitimate mineral activity. The court's decision is not an aberration; on the contrary, it is a careful and conscientious reading of existing law. As it illustrates, the Mining Law does not allow sensible businesspeople to take sensible steps to add to the nation's mineral wealth. Instead, it invites abuse, litigation, "strike" or nuisance locators and under-the-table buyouts of them, unnecessary environmental damage, unwarranted interference with many other values served by the federal lands, and a host of other problems.

The brakes the Mining Law puts on mineral activity are especially troublesome because they are just as effective when someone is looking for a mineral of strategic concern like cobalt as they are when one is looking for an uncommon variety of sand or gravel. The recent Nevada litigation I've summarized could just as easily have involved a strategic mineral, and the difficulties would have been exactly the same, because the Mining Law spans a wide spectrum of minerals, from very widespread, easily found ones to rarer, isolated ones. A claim that is located for some low-value widely occurring mineral may discourage or otherwise jeopardize development of a mineral with national security implications. Primarily for this reason, as I have explained in considerable detail in my book, it would be a mistake, and a potentially very dangerous one, to rely on the Mining Law as it currently exists to promote the location of domestic deposits of strategic minerals.

As I have suggested, these problems have not emerged suddenly. On the contrary, they have been recognized a long time. Horace Winchell, a renowned mining geologist and engineer, testified before a predecessor of this committee some years back, and described how the Mining Law had been "stretched and warped and evaded," leading to "expensive litigation, dishonesty on the part of the locators, and connivance on the part of the land office officials." His conclusion: "[T]he mining law . . . is defective, inadequate, antiquated and pernicious, and is opposed by the majority of mining operators. [It] should be radically changed." Those words (which were echoed by Foster Bain, then Director of the Bureau of Mines) were spoken in 1922. They are equally true today.

Outside the mining industry, the problems created by the Mining Law have been well documented, and I won't do more than mention some of them briefly. There have been numerous cases of abusing the Mining Law for non-mineral ends. Land along trout streams, valuable timber land, recreational home-sites, and even the Bright Angel Trail and the most popular viewing sites at the Grand Canyon have been claimed under the Mining Law, for purposes that have nothing to do with mining. By giving people free, unrestricted access to the federal lands and an unfettered opportunity to locate claims that can only be contested after-the-fact in time-consuming, expensive proceedings, the Mining Law simply invites this kind of abuse, and many unscrupulous people have accepted the invitation. Today, the Mining Law is used, for example, by marijuana cultivators and others conducting illegal activities on federal land to provide a legal toehold for occupancy. Only when abuses reach truly flagrant dimensions does the government crank up its machinery to oust such claimants, and even then if the land is not withdrawn from the operation of the law, new claims can immediately be located and the cycle repeated *ad infinitum*.

Even when legitimate mineral development is being pursued, the Mining Law is seriously out of step with modern notions about how the various uses of the federal lands ought to be balanced against each other, and how the environmental impacts of mining operations ought to be assessed and controlled. I was recently told, for example, that a miner had located a claim on the face of Aspen Mountain, in a position that could seriously interfere with the downhill skiing that is the dominant economic force in that area.

But there are much more troubling illustrations of this problem. Let me step for a moment outside my ordinary role as Professor of Law at Arizona State University, and put on one of my other hats, as a member of the Board of Directors of the Grand Canyon Trust, a private, non-profit group-organized in late 1985 and dedicated to the protection and wise management of the natural resources of the Grand Canyon and the Colorado Plateau. Almost from its inception, the Grand Canyon Trust has been concerned about the growing threats to Canyon and the Plateau region from the extensive prospecting and mining operations being conducted there. The Mining Law applies because the mineral involved is uranium.

Since 1980, an estimated 50,000 mining claims have been filed on BLM land on the Arizona Strip just north of the Grand Canyon National Park. About a half-dozen mines are in operation or being developed in this area, and a number of sites of active exploration are located very near the northern boundary of the Park. Exploration is also intensifying south of the park, and last year the Forest Service approved a new mine a few miles south of the Park entrance.

This extensive activity raises some serious concerns about protecting the wonders of this extraordinary area. Besides the usual visual and noise impacts attendant to the mineral activity, there is also the problem of opening up remote areas by new or improved roads, which among other things threatens increased vandalism of Native American archeological, cultural and historic sites. In addition, there are uncertain but potentially serious effects on the quality of surface and groundwaters in the area, and some doubts about how extensively the mine sites and haul roads can or will be reclaimed in this arid land.

Drafted in an era when environmental concern was far different from what it is today, the Mining Law has, somewhat haphazardly, been modified by more recent laws to allow some measure of environmental regulation. But this process of accomodation to modern environmental imperatives has been far from smooth and sure. While the federal agencies involved have exercised some of the authority they have to try to deal with these problems, they believe they are constrained by the Mining Law itself from taking some actions that they agree need to be taken. There is considerable room to disagree with the narrow interpretation these agencies take of their powers, but no one can deny that the Mining Law has a chilling effect on their willingness to regulate activities being carried out under that Law.

From a broader perspective, the Mining Law contains no mechanism that would allow the federal government to take a comprehensive look at all these mining activities around the Grand Canyon. On the contrary, it emphasizes piecemeal, uncoordinated mineral developments whose individual impacts may be tolerable, but when combined pose unacceptable threats to the non-mineral values of the area.

In short, the relationship of the Mining Law to other more recent laws emphasizing environmental impact assessment and control, and careful, comprehensive advance planning of the uses of federal land, remains controversial. Therefore, until the Congress resolves these issues, we are likely to see continued conflict and litigation. Meanwhile, it is a distinct possibility that, thanks in large part to the Mining Law, an extensive network of mineral operations will be developed in one of the most highly prized natural areas on the planet without the landowner, the U.S. Government, taking any meaningful steps to plan for, control, or otherwise play an active, guiding role.

Because the Mining Law is such a loose cannon on the federal land management deck, administrations of all political persuasions have often decided that the better course is simply to withdraw land entirely from the operation of the Mining Law, putting it off limits to future exploration as well as production. The temptation to do this is especially great because the Mining Law allows federal land surface, as well as the minerals, to pass into private ownership for what amounts to a piece of change, $2.50 or $5.00 an acre - an amount fixed in 1872. About three million acres of federal land, nearly all of it in scattered, twenty acre parcels, have passed into private ownership under the Mining Law since 1872. But very little of that land, which often constitutes troublesome inholdings amid federal lands valuable for other uses, has ever seen any mineral production.

If the opportunities for abuse were more limited, and the ability to protect other values from mining operations were better defined than they are now, the withdrawal tool would probably not have to be exercised so frequently, and perhaps even some existing withdrawals could be revoked. This is just another example of the Law's perversity - it is simply too easy to locate and maintain a mining claim, leading frequently to withdrawal of the lands and the thwarting, rather than promoting, of mineral activity.

The problems with the Mining Law are not something that either the courts or the administering agencies - principally the Department of the Interior - can cure. Indeed, these institutions have tried their best over the years to keep a semblance of sense in the functioning of the law. And their manipulations of - and in some cases frank departure from - the language of the statute has helped keep it creaking along. But the courts and the agencies cannot solve most of the problems, like the lack of protection during exploration, the vagueness of the discovery standard, and the difficulty of meshing the law with protection of other values on the federal lands. Only Congress can make the fundamental changes that are necessary.

I would be perhaps the last person to suggest that legislative reform will come easily. One chapter in my book recounts the history of efforts to change the Mining Law, and it's a lengthy one. Reforming the Mining Law is a challenge that has defeated well-intentioned and thoughtful people, inside and outside Congress and the mining industry, for a century. If there were a magic formula, it surely would have been discovered by now.

But a solution ought to be found. An important first step is being taken with these hearings, and I commend the Chairman for his determination in holding them. Justice Brandeis once said sunlight is the best disinfectant, and holding this travesty of a law up to public exposure will, in effect, hold it up to ridicule. This exercise ought to challenge the people who are concerned about the law to sit down and try to explore solutions that can command, if not enthusiastic support, at least acquiescence from the various different interests affected.

But let me close with a caveat. As originally drafted, the Law was intended to ratify the rules devised by the miners themselves, who worked them out in the mining camps in the foothills of the Sierra Nevada range in California in the mid-nineteenth century. Although these miners abhorred the notion of holding mining claims indefinitely without production, one of the most important ways that the Law has been perverted is by making it easy (through a variety of mechanisms, nearly all unintended) to locate and hold mining claims without any serious attempt to add to the nation's mineral wealth. The result is clear: Of the nearly two million mining claims currently recorded as existing on the federal lands, only a very tiny fraction has seen serious exploration, and an even tinier proportion number has supported actual production. Yet these claims cover most of the areas that are likely to produce minerals in the future, and constitute potentially fatal obstacles to legitimate mineral activity.

Moreover, these claims, littering the landscape like so much confetti, are a nuisance for anyone who wants to use the public lands for other purposes. Applicants who want to obtain rights-of-way for roads, pipelines, or transmission lines, builders of water projects and numerous other users of federal land are often delayed, if not actually hamstrung, by the presence of unpatented, dormant mining claims on the land they want to use. In the same way, states or private entities interested in exchanging lands with the federal government are forced to spend a considerable amount of time and money clearing the land of mining claims, or negotiating around them. (The problem of existing, inactive mining claims ultimately proved to be the most serious obstacle to Utah's completing its Project BOLD proposal for a large-scale exchange of isolated state school sections for larger units of federal land.)

In short, any reform effort that fails to address the problem of existing claims, by simply grandfathering them wholesale, will not be much of a reform at all. When Congress came, in 1920, to remove oil and gas, oil shale, and certain other minerals from the ambit of the Mining Law, it generally grandfathered claims for these minerals previously located under the Mining Law. Litigation and controversy has surrounded these claims ever since, as witnessed most recently by the oil shale claim settlement entered into by the Department of the Interior last fall that has commanded much attention in the Congress, and especially this Committee.

A lawyer for these claimants recently estimated that the federal government had spent, before it capitulated last fall, $100 million since 1961 litigating the validity of these grandfathered claims. If one adds to that the claimants' cost of litigation over that same period, plus all parties' litigation costs between 1920 and 1961, it is likely that perhaps a billion 1987 dollars has been spent on the legal controversies caused by Congress' 1920 decision to grandfather these claims. Meanwhile, even though about 432,000 acres of grandfathered oil shale claims have passed into private ownership for no more than $5 an acre since 1920, there is still no commercial production of oil shale.

As this illustrates, if the problems created by the Mining Law are to be truly solved, existing claims have to be dealt with, and converted wherever possible to whatever new system is devised. Congress has ample power to accomplish this. Few of these claims have any hope of showing a discovery, and the claimant does not have a property right unless a discovery exists. Thus there is, in general, no serious constitutional obstacle to applying whatever reforms might be adopted to existing claims.

I commend this Subcommittee for creating this opportunity to ventilate the serious problems that exist with the Mining Law. It is, of course, impossible to approach the subject of reform without a sense of nostalgia. The nineteenth century miners who fanned out over the landscape in search of minerals were in the vanguard of western settlement. We owe them much for their arduous, often perilous labors, and not just in the minerals that have been produced. Some of the most colorful bits of western lore revolve around mining activities, and they have fired the imagination of some of our most creative writers, from Mark Twain to Wallace Stegner.

But times and values change. The economy of much of the West, once dominated by mining, has undergone a profound shift toward recreation and tourism. That means that mining no longer deserves a preeminent place among the possible uses of federal land. Moreover, we are much more sensitive than we used to be to the scarring of the landscape, the degradation of air and water, and the impairment of the other values of the land that mining causes.

We ought not let sentimentality for days gone by cloud our vision of what is necessary to serve today's needs. The mining industry, other users of the federal lands, and the nation would all be better off if the Mining Law (and my book about it) were turned into objects of purely historical interest by meaningful reform.

Senator **Bumpers**. Gentlemen, thank you both very much. Senator McClure.

Senator **McClure**. Mr. Alfers, you indicate that there is a problem if, unless the mining claimant gets permanent title—did I understand you correctly?

Mr. **Alfers**. Yes. I think there is a problem by cutting back on the number of sticks in the bundle and how well the bundle is wrapped when it comes time to issuing the patents.

In the mining process, and I think one of the elegant features of this general mining law is that as a mining operation moves from prospecting to exploration to development to mining, the law itself brings with it its own appropriate level of security of tenure of title.

The prospector under the general mining law has very little security of title. He is a mere licensee of the United States. He/she corporations, domestic corporations are all qualified locators, and they are invited to be on the public lands, looking for mineral.

But beyond that, that prospector has no title. He has only the right of actual physical possession, and he can protect with that, pedes possesseo, just his own workings, perhaps the confines of a single claim.

But as that prospector works the ground and makes a discovery of a valuable mineral deposit, and then completes the rest of the acts of location, the posting of the notice and the monumenting of the claim, and all that goes with the other acts of location. He has a mining claim, and at that point, under the general mining law, that is a mining claim that is property against the world—all except the paramount title of the United States.

But that is not patent. That is not fee simple.

Well, at this stage of the operation, often in today's industry, a mining company, or mining operation will have to go to patent.

Ordinarily, at least in my practice, at least, clients do not take large land positions to patent, because it is risky and it is very, very expensive.

When you file a patent application, the Department of the Interior almost immediately issues a, initiates a contest. It certainly has the power to do that.

And so as——

Senator **McClure**. When you file for patent, they—did I understand you to say that they do, as a matter of practice, start a contest?

Mr. **Alfers**. They have the authority to initiate a contest, and very often they do. And so they—

Senator **McClure**. But not automatically as a matter of policy?

Mr. **Alfers**. It is not automatic.

Senator **McClure**. Now, as a matter of fact, at that point it is a part of the affirmative requirement of the law that the claimant make affirmative proof of the existence of the ore body or mineral?

Mr. **Alfers**. That is right, and that is the first time in the, under the mining law in which a locater must affirmatively establish to the United States that he has a valid mining claim.

Exceptions to that are in the event of withdrawals, or other reasons that the department might have to initiate a contest.

And in any time the department initiates a contest of a mining claim, that locater then is put to his proof on that day, and must then show, among the other acts of location, a discovery of a valuable mineral deposit.

Senator McClure. Now, he could have been put to his proof earlier

Mr. Alfers. That is exactly right. I mean, the case of locations, the Interior Department could always initiate a contest.

Senator McClure. As could the Department of Agriculture through the Forest Service.

Mr. Alfers. I ought to know the answer to that, but I am not sure.

Senator McClure. Well, I will tell you the answer to that. It is yes. The Forest Service does do it upon occasion. And oftentimes do, even if there is no patent application.

But you have indicated that once you have done that, you have gotten to that point, then the locater, the claimant, should be able to get title against the world and against the government forever?

Mr. Alfers. That is right.

Senator McClure. Regardless of what he might use the land for in the future?

Mr. Alfers. I think that is right.

Senator McClure. Now, you, well, you said that is right, and then you said, "I think that is right, 'which indicates there might be some doubt.

Mr. Alfers. This is why I think that is right.

Senator McClure. Okay. [Laughter]

Mr. Alfers. Part, it seems this afternoon we have been confusing a couple of concerns. One of those concerns is that a patent may issue under the mining law a piece of ground then is used for something other than mining purposes. That bothers me. That bothers the public. That bothers everybody.

But it is not because the issuance of the patent or the use of patented land is offensive. The suggestion is that the patent should not have issued.

And so I wonder about the enforcement, and I wonder about the adjudication of the patent application, when I hear of those kinds of situations.

The other concern that we have is the use of patented lands in the future for non-mining purposes.

And when I began to see this in the GAO report I began to think a bit. None of us is concerned that the entire town of Lincoln, Nebraska is not used to raise corn. Those lands were patented under the Homestead Act many years ago, and I am quite sure that in almost all of those instances, those lands were used for homesteads. But that was then, this is now.

And now that those patented lands are used for real estate or buildings, or whatever, we should not be concerned with that.

Senator McClure. Well, we certainly were not at that time, have not been up until very recently. But that does not necessarily mean that we have the same attitude.

It was not until FLPMA was passed that we classified lands, or had those unclassified lands formally withdrawn from future disposal.

It was not until the passage of FLPMA that we said we intend to keep those lands. Up until that time the lands had been held by the federal government as in an interim between the imperial majesty of government and private ownership. And it was only with the passage of FLPMA we decided we would become imperial masters of that land in perpetuity.

So we have had a change of political attitude in this country with respect to public lands, and I think it has occurred in the last 40 years. But I think it has occurred.

And against that backdrop I think most people are saying, since we have now classified these lands for permanent retention, there is something wrong about somebody saying, I want it for this purpose, but I am going to use it for that. Much different than the 1864 enactment of the Homestead Act in taking up Lincoln, Nebraska.

Senator BUMPERS. Is the logic that if we just keep patenting all these lands maybe we will get another Lincoln, Nebraska out of it? [Laughter.]

Mr. ALFERS. No. The logic is that the disposal system, while not locked to immediate concerns, has in mind the purposes for which the disposal was made.

And for mining purposes or for railroad purposes, those purposes had been served.

Senator MCCLURE. Well, I am sure if Oklahoma has an opportunity they will close down the football stadium in Lincoln. [Laughter.]

Mr. Leshy, have you read the GAO report?

Mr. LESHY. Yes.

Senator MCCLURE. Did you find it disturbing that many of the examples, if not most of the examples used by them were based upon false premises?

Mr. LESHY. I am not sure I know what you mean. I thought—there was nothing in the GAO report that surprised me about how the law operated. I did not attempt to verify any of their specific cases, although I know a couple of them because they are in my hometown of Phoenix.

Senator MCCLURE. Well, let us take that one in the hometown of Phoenix. When was that patent issued?

Mr. LESHY. There was one—well, I do not recall the exact date. One in 1981 and one in 1987, as I recall.

Senator MCCLURE. And when was the claim filed?

Mr. LESHY. I expect, although I do not think the GAO report indicated, I expect they were probably pre-1955 sand and gravel claims, although I think one of them actually probably was a post-1955 uncommon variety of building stone.

Senator MCCLURE. Well, I think if you will check you will, indeed, find that they were filed as sand and gravel claims, and the law changed in the interim, and that situation is not possible anymore, even though the GAO report uses as an example of a current abuse.

Now, how can it be a current abuse, if it cannot happen anymore?

Mr. LESHY. Well, a couple of points. I suppose for one thing, when Congress changed the law in 1955, it made a conscious decision, which I think in retrospect was a wrong decision, to grandfather those claims.

And the law has also been administered, as we have heard a lot today, in such a way as to allow people to hold claims indefinitely, without either producing minerals, or going to patent, or anything else.

Senator McClure. That is a different issue.

Mr. Leshy. Yes. Although that explains why when you grandfather something in 1955, 30 years later it can still be turned into something like a surface patent.

Senator McClure. But not illegal, and——

Mr. Leshy. No. No.

Senator McClure. And neither illegal then or now, nor is it possible now.

Mr. Leshy. That is right. Although in the 30 odd, or 40 years, or however long it has been since those claims were located, obviously, the character of Phoenix, Arizona has changed a lot. And what might have started out to be a legitimate and genuine effort to mine sand and gravel, I think probably turned into a somewhat less than legitimate effort to make a real estate killing in what turned out to be very valuable real estate for residential or commercial purposes, and had nothing to do with mining of sand and gravel.

Senator McClure. It has nothing to do with mining today. It has nothing to do with mining practices today. It has nothing to do with what can be done under the law today.

Mr. Leshy. Well, I think it has something to do with what can be done with the law today. Actually, one of the points, one of the difficulties——

Senator McClure. Go try to file a claim for sand and gravel today.

Mr. Leshy. Well, one of the difficulties I have with the committee's proposal, or the staff proposal, is that it does not repeal the uncommon varieties exception. And that is a source of a significant amount of abuse.

I think if you look at the GAO report and look at what the minerals were that were subject to those patents that they were calling into question, most of them were either grandfathered pre-1955 sand and gravel claims, or post-1955 claims for substances like building stone, sand, gravel, et cetera, the so-called uncommon varieties of those substances, which are still subject to the mining law today.

I can go out on unappropriated federal land and file a mining claim for sand and gravel. Ordinary sand and gravel, and argue when they come after me, if they come after me, which they usually do not, that it is a so-called uncommon variety.

And then I can hire an expert to say, my sand and gravel is different from everybody else's sand and gravel. And if it is, and I can prove that, then it is subject to the mining law.

So the problem goes on. It is not solved entirely by the 1955 legislation.

Senator McClure. Do you have any example of a sand and gravel claim that has been upheld under the current law on the basis it was uncommon?

Mr. **Leshy**. Oh, sure. Oh, yes.

Senator **McClure**. Can you furnish that to the committee, please?

Mr. **Leshy**. Actually, I know building stone, I know silica, I am not sure about sand and gravel, but I feel fairly comfortable in saying yes.

Senator **McClure**. Would you provide me with a list for the committee, please?

Mr. **Leshy**. Sure.

Senator **McClure**. I have no further questions.

Senator **Bumpers**. Senator Burns.

Senator **Burn**. Mr. Leshy, I have a question. Is a mining claim a fee simple, subject to a condition subsequent. If not, what is a mining claim? I would just like to hear your definition of that.

Mr. **Leshy**. Well, a mining claim is a possessory license on federal land until there is a discovery, or that is, it is a revokable license, which legitimizes your presence on federal land, and is good against everybody but the United States government, so long as you comply with the assessment work and other requirements. That is possesseo.

Upon a discovery it becomes a, some sort of property interest. A property interest that contains a right to mine and nothing else.

And then if you go the next step further and apply for and get a patent, it becomes fee simple.

So there is a—really, it is a staged process. You have an interest which increases over time as you comply with the various steps the law sets up.

So there is no one answer to the question of what is a proper, what kind of interest is a mining claim.

Senator **Burns**. I have no further questions.

Senator **Bumpers**. I want to make this point for the record. That this GAO report is just the last in a long series of studies that have been made of this law, every single one of which have recommended significant revisions in the law.

In 1970 the Public Land Law Review Commission found that the mining law of 1972 had been abused. But even without that abuse, had many deficiencies, made recommendations for modifications. Included, virtually, all the modifications that our bill contains.

And then the General Accounting office has issued studies in 1974 and 1979, and the 1989 was just the most recent one—recommended the mining law be revised.

Now, with that, Mr. Alfers, let me just ask you—it seems to me that you find this ability to use the land for non-mining purposes odious, but you do not want to do anything about it. Or maybe you do not find it odious?

And in which case, I do not know what we are here for. I mean, I hope, I thought the whole purpose of the 1872 mining law was to encourage mining. And if we are going to encourage the use of the land for some other purpose, then we ought to state that.

Mr. **Alfers**. Well, I did not think I weighed in in favor of using the mining law for any purposes other than mining.

I do think that there is adequate, private and public enforcement under the existing law to rid the public lands of void mining claims.

If there is a mining claim out there, and it is used for cabins, or used for access to trout streams, then I doubt that that is a good faith location, and it could be contested on that ground alone.

And if by further——

Senator **Bumpers**. But once the patent is issued to the surface, you get fee simple title, and BLM no longer has any control over it. You can do whatever you want to. You can mine it, you can build a cabin on it, ski resort, whatever.

Mr. **Alfers**. That is a somewhat different consideration, and it makes me wonder about the quality of the adjudication of the patent.

And I think that, and in the event that in the adjudication of the patent there is a suspicion that the claim might not be used for mining purposes, then a very thorough examination ought to be underway.

But if there is gold out there, I would be very surprised if that property——

Senator **Bumpers**. But, Mr. Alfers, that is my very point. If you only allow a patent on the minerals, you do not have to worry about that. You do not have to worry about the adjudication of the patent.

He is either going to explore, he is either going to develop the minerals, or he loses them.

Mr. **Alfers**. Well, that is exactly right, and I think the reversion accomplishes the same result.

Senator **Bumpers**. And on the reversion, Mr. Leshy, I think that—number one, I think the Super fund law probably already covers it. Now, number one we try to get at that by requiring bonds. Everybody who is going to do that kind of damage to the surface ought to put up a bond.

Number two, let us take, for example, the cyanide problem. If it does actually get into the ground. Mr. Snow thinks it is a fairly innocuous substance and would not, that it sort of self-destructs.

But let us just assume for the purposes of argument that it does not, or any other chemical that is being used gets into the ground water supply, and pollutes all the neighbors domestic water.

In my opinion, the Super fund law right now covers the liability of the culprit who did it. And even if the land reverts back to the United States, it still does not relieve that polluter of the responsibility of the cost of cleaning that up.

Is that not your understanding of the law?

Mr. **Leshy**. Yes. If that person is still around. As a corporate entity——

Senator **Bumpers**. Well, of course, we have that problem everywhere, not just in the mining law. We have people who take bankruptcy, people who skip the country, do all kinds of things. And we just have to—that is what the Super fund is for, to take care of those instances where we cannot hold somebody personally or corporately responsible.

Mr. **Leshy**. Yes, that is right. Of course, the Congress last year addressed a similar problem that was, I think, raised earlier today, and that is the BLM's liability under these reversionary clauses for land that gives to local governments for landfills that was a problem that Congress had to fix. And it could fix it in this context, as well.

I just wanted to say one thing in response to something Mr. Alfers said. When the government reviews a patent application, it never asks, as far as I know, and the law really does not allow it to ask, whether the land is more valuable for minerals than something else. And that is the problem. That is the exact problem.

And in other words, it can look at and say, well, you have got a trace of gold here that may or may not be a discovery——

Senator BUMPERS. And this is the only federal land where that question is not asked.

Mr. LESHY. Basically, that is right.

Senator BUMPERS. As far as I know, there is no other law on the books where you do not consider any other use of the property. Here, if you stake a claim on it, it is an immediate assumption that the highest and best use of this land is for mining and hardrock minerals.

Mr. LESHY. That is right. Exactly. And it puts blinders on the agency to not look at anything else but that.

And so when the BLM sits down to review a patent application and says, look, everybody in the world, including us, knows that if we patent this land it is going to turn into a real estate development, or a motel, or a ski area, or whatever.

But we are not allowed to ask that question. We are not allowed to act on that information. Our only judgment under this law is minerals. And that is part of what is wrong with it.

Senator BUMPERS. I thank you both for being here today. You are excellent witnesses. We will probably be submitting questions to both of you.

Mr. Leshy, I understand you have been helpful in submitting information already. I would like to thank you publicly for that.

I must say this afternoon I found a lot more agreement. There may be disagreement on how we are going to accomplish some of these things, but some of the goals, I have been rather surprised, there seems to be a remarkable amount of agreement on. So we will continue to work and see if we cannot get something out of this.

Thank you very much.

Our last panel is Mr. Don Smith, President, Citizens for Mining, Battle Mountain, Nevada; Mr. Charles Roybal, Executive Director, New Mexico Mining Association; Mr. John Neff, Secretary Northwest Mining Association, Spokane; Mr. Gary Langley, Montana Mining Association, Helena; Mr. Curtis McVee, Executive Director, Alaska Miners Association.

Gentlemen, let me say to you on the front end that we have a vote scheduled in three minutes. We will go ahead and take perhaps the first witness and maybe the first two witnesses, and then Senator McClure and I will have to run and vote. And I cannot promise you we will be back immediately, because there may be another vote immediately after that; but we will be back as quickly as we can get here.

I believe that may be the vote right now.

Mr. Smith, we have time to take your testimony before we leave, so would you please proceed?

STATEMENT OF DON SMITH, PRESIDENT, CITIZENS FOR MINING

Mr. SMITH. Mr. Chairman and members of the subcommittee, my name is Don Smith. I am president of Citizens for Mining of Battle Mountain, Nevada. Our group is made up of small miners and prospectors from many western states.

I would like to thank you for the invitation to appear at this hearing. After much discussion of the Mining Law of 1989 last week, our group has decided that it is not a good bill for our industry.

In addition to my oral testimony, I would like to submit a more complete statement attached, which outlines in more detail the independent miners' viewpoint, for inclusion in the hearing record. Also, I have brought another testimony of Touchstone Resources, which I gave your secretary 100 copies. Enter that into the record if you would, and I will go on.

The 1872 Mining Law has worked well for over 100 years. It has been modified various times to allow new concerns of more modern times to keep mineral development going ahead. Historically, the role of the small miner and prospector has been to go out and find minerals, and if the investment to work the property is too high, try to find a large company that has the finances to develop the property into a mine if there is a mine there. Very few mines have been found by the large companies, as there are more small miners and prospectors out searching for possible deposits.

Prospecting for minerals has been and should be encouraged by allowing individuals as well as companies maximum nondiscriminatory, nonexclusive access to public lands in the search for mineralization. A prospector or miner should be given exclusive exploration rights for any particular area during the time he is doing detailed exploration on the property. A person who discovers a viable mineral deposit should have the exclusive right to develop and mine it, including the right to defer such development for a reasonable period of years when technological or economic conditions justify production.

The law must provide a mining venture with security of tenure for the duration of mining on terms reasonably set in advance. Midstream shifts in government mining policy can be and are devastating to many marginally profitable mining operations. The existing mining laws serve these objectives well and do so without thwarting other important public policy objectives.

Even in today's world of high tech, large-scale mining, the small miner and prospector play an important role in the success of mineral exploration and production in the United States. Many recent discoveries in the western U.S. can be attributed to the small prospecting, exploration and mining concerns. Prospectors will often go back to a certain claim or block of claims several times to sample and evaluate over and over until they find the element that they missed the first few times. Then it all comes together, and they can define a good prospect.

About 30,000 people are employed in mining in Nevada with 10,000 direct mining and about 20,000 support people, such as equipment parts companies, fuel oil companies, equipment companies. There are 62 mines either in operation or starting up.

If this bill is enacted, it will sure mean a lot of jobs will be lost, state and local governments will be stuck with paying off bonds that were needed for expansion of city water and sewers, streets and schools. The people that are left in these towns will get to pay a real high tax rate to pay off the bonds. Also, a lot of money will be lost to the Internal Revenue Service because the workers are no longer employed.

The state and counties will be devastated for the lack of tax money that the mines are now paying. Most mines could not afford to pay the eight percent gross royalty plus the state taxes, too. The way the price of gold has been falling, a few mines are becoming unprofitable now. The more rules and regulations that exist just takes that much more profit out of the business.

It takes two things to make a business successful: incentive and profit. Neither will exist if the Mining Law of 1989 is enacted.

Mr. Chairman, thank you again for the opportunity to testify today. I will be pleased to respond to any questions.

[The prepared statement of Mr. Smith follows:]

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Statement of

Don Smith, President
Citizens for Mining
on

General Mining Law

Before the
Subcommittee on Minerals Resources
Development and Production
of the
Committee on Energy and Natural Resources
United States Senate

June 7, 1989

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Historically, the role of the small miner and prospector has been to go out and find minerals and, if the investment to work the property is too high, try and find a large company that has the finances to develop the property into a mine, if there is a mine there. Very few mines have been found by the large companies, as there are more small miners and prospectors out searching for possible deposits.

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The existing mining laws serve these objectives well and do so without thwarting other important public policy objectives.

Even in today's world of high-tech, large-scale mining, the small miner and prospector play an important role in the success of mineral exploration and production in the United States. Many recent mineral discoveries in the western U.S. can be attributed to small prospecting, exploration and mining concerns.

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Also a lot of money will be lost to the Internal Revenue Service because the workers are no longer employed.

The state and counties will be devastated for lack of tax money that the mines are now paying. Most mines could not afford to pay the 8% gross royalty, plus the state taxes too.

The way the price of gold has been falling, a few mines are becoming unprofitable now. The more rules and regulations that exist just takes that much more profit out of the business. It takes two things to make a business successful, incentive and profit. Neither will exist if the "Mining Law of 1989" is enacted.

Mr. Chairman thank you again for the opportunity to testify today. I will be pleased to respond to any questions.

The Mining Law of 1872,
The Independent Miner's Viewpoint.
An Overview.
By Don Smith, Battle Mountain, Nevada

Since its adoption more than 100 years ago, the Mining Law of 1872 has been the principal legislative standard by which miners and prospectors have thrived.

In its 116-year history, the 1872 law has become "settled" by countless lawsuits, court challenges and legal rulings. Thoroughly proven in the legal arena, it has become well understood by most miners. Overall, the United States mining community--especially independent miners and prospectors--firmly believe the law should be retained.

Today, the Mining Law continues to work well. New gold mines are being developed in many parts of the West. Most of these mines were located by prospecting allowed under the Mining Law of 1872. Clearly, the law is accommodating this activity, permitting crucial strategic mineral production and much needed economic development to go forward in rural parts of Nevada, Idaho, Montana, Washington, South Dakota, Oregon, California and other states. Many of these rural areas have weak economies and clearly benefit from the payrolls and taxes generated by established--as well as new--mining activity.

Prospecting for minerals has been and should be encouraged by allowing individuals, as well as companies, maximum non-discriminatory, non-exclusive access to the public lands in the search for mineralization. A prospector or miner should be given exclusive exploration rights for any particular area during the time he is doing detailed exploration on the property.

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Prospectors will often go back to a certain claim or block of claims several times to sample and evaluate over and over until they find the element that they missed the first few times; then it all comes together and they can define a good prospect. Often, the prospect will be taken to a larger company for further development.

In the last 20 years, for example, I have made several mineral discoveries in central Nevada. In 1968, 1969 and 1970, I located some 600 mining claims in four different counties. This was all the claims that I could afford at the time, as I had a good deal of mining equipment but not much operating capital.

I proceeded to evaluate the properties one at a time. If nothing of value was found, I dropped those claims and worked on another group. This process was repeated until I had evaluated all the claims in 1971. After completing the evaluation process, I retained 300 claims for further inventory work, such as drilling.

In those years, not much was being done to develop gold properties as the commodities price was low and new extraction technology had not been proven. The microscopic gold found so abundantly in northern Nevada had inherent extraction challenges which would not be solved for several years. Inversely, with little financial incentive in gold mining at the time, prospecting in the region was low priority for any individuals and companies.

In 1975, I successfully lobbied an oil company to locate claims around a block of mine. They drilled 22 holes but found only a trace of gold in five. Exploratory drilling stopped and it would be 1980 before there would be further interest in the claims. Another company began drilling and they found an ore body that is still being worked today. Our first drilling in 1975 had one hole that missed the ore body by only 50 feet. This mine is on the now famous "Carlin Trend," along with eight other new mines that have been located there since 1975.

In 1971, I located turquoise deposit that we are still working today. Both the demand and price were good from 1977 to 1981 But then a method was discovered where low grade turquoise, found abundantly in large copper mines, could be treated and sold at a much reduced price. The bottom fell out of the market for natural turquoise. Though the price has firmed for natural turquoise, the demand is soft.

In 1968, I prospected and defined a barite property which was very large. Being 13 miles from the nearest road, however, it was rather inaccessible. At that time, the price was soft and demand was poor. The closest rail head was 85 miles. These claims were dropped for ten years until the price and demand began to rise. They were re-located, filed and a 13-miles road built to access them. THe first load of ore was shipped from the mine in 1979. In 1981, the mine was closed when foreign imports, especially from China, sent the price plummeting. Nearly the entire barite industry in northern Nevada ceased operating that year.

In 1970, I located 90 claims of mercury that showed a great deal of promise. The next year, however, the commodity price began to decline and continued dropping for several years. I still worked these claims knowing that gold and silver are often associated with mercury. I was not able to have further exploration work done on the claims, though. When I could not interest a larger company in them, they were dropped as the expense of time and money was more than I could afford.

In 1982, a major company found gold and silver partly on my old claims and partly on another block. They drilled through the mercury and found sizeable deposits. Today, three new mines are being developed where I held the original 90 claims. By new drilling equipment and technology, improved methods of sampling and highly refined methods of extraction, many once marginal deposits have been and are being developed with a high degree of profitability.

The last property that I still have is a placer gold deposit that I have held claims on since 1981. The claims have been extensively drilled for the last seven years and several small companies have tried various methods of recovery with varying degrees of success. One specific type of recovery has proven itself on these claims and mining will soon go forward using that method. According to estimates, there are 62,857 oz. of recoverable gold that will take about five years to mine. This is too small a deposit for many large companies to be interested in and we will mine this ourselves.

All of the properties that I have explored or worked for the last 25 years were allowed under the provisions of the 1872 Mining Law. Had more restrictive prospecting, exploration, claim and production regulations been in force, as some are now advocating, none of this work would have been possible. Had a leasing system of public land mineral access been in place, I could not have competed with large companies in the bidding process. They, in turn, would probably not have prospectors to send out in the field to find deposits on their own. In a very few years, the present mines would be worked out with very few new operations commencing.

As many of the minerals vital to the strategic interests of the country are prospected, explored, defined and extracted under the provisions of the 1872 Mining Law, it is imperative for the United States to encourage a healthy native minerals extraction industry--from the large, multi-million dollar mines to small entrepreneurial companies like mine. The 1872 law, legislation that has withstood the test of time and has served the country well, must be retained.

The ramifications of losing the law are frightening: Restrict mining activity in the United States and increase imports from foreign countries, thus exposing our domestic manufacturing industries to the potential political fluctuations of offshore supply. Many imports come from Communist nations and politically unstable countries. These supplies could suddenly be cut off.

The combined discovery success rate for individual prospectors, small miners and large corporate exploration departments is still very small, considering the enormous tracts of land that hold potential for discovery. In order to continue defining new deposits, it is necessary to keep searching the earth, developing new theories and improving applications of old methods.

Above all, we must have the legal ability and economic incentive to continue mining. The Mining Law of 1872 works well in meeting these requirements.

In light of the strong environmental movement sweeping America, there are some groups and organizations who want to change bits and pieces of the Mining Law. But once the door of change has been opened, the complete law could be lost. A leasing system would be the next logical step to replace it. That would devastate and stifle the domestic mining industry as we know it today.

It takes many years for new rules and regulations to be implemented and legally defined. With people having a myriad of opinions and legal definitions of any new legislation, the mining industry would become consumed both physically and financially in a legal "black hole." They would become mired in litigation while America's industry starved for the raw materials the mineral industries produce. The door, then, would open wide for a flood of imports, driving the final nail in any hope that our domestic industries would remain viable. At that point, U.S. mining would cease to exist, becoming the next passenger pigeon.

The 1872 mining law needs to remain intact. It works well with the multiple-use principles of public land management and planning. To quote a time-honored phrase, "if it ain't broke, don't fix it."

Senator **Bumpers**. Gentlemen, we will stand in recess until we can go vote. There is a possibility there will be another vote following this one immediately, but we will be back as quickly as we can. I apologize.

[Recess.]

Senator **Bumpers**. Mr. Roybal, you are next on my list.

STATEMENT OF CHARLES E. ROYBAL, EXECUTIVE DIRECTOR, NEW MEXICO MINING ASSOCIATION

Mr. **Roybal**. Thank you, Mr. Chairman, members of the committee.

I am Charles Roybal, Executive Director of the New Mexico Mining Association. The New Mexico Mining Association is a nonprofit association organized for the purpose of promoting the interests of mining in the State of New Mexico.

Mr. Chairman and members of the committee, I will skip over a large part of the testimony that I have prepared and have submitted into the record. It largely indicates our willingness to stay at the table, work late into the night, and address these issues; and I want to reaffirm that right now to you and to the rest of the committee.

Mr. Chairman, we will skip straight over to some of the provisions of the bill that we would like to address very briefly and indicate some of our concerns. The proposed legislation which this subcommittee is now considering attempts to correct perceived deficiencies in current law. In addressing these issues, however, the bill creates certain impediments which would probably eliminate the small miner as a viable actor in mineral exploration and development. The significant increased costs of mining which would be triggered by the bill also mean that low grade ore bodies would no longer be economically viable.

Some of the specific aspects of the proposed legislation which merit special consideration and scrutiny by this committee include the provisions for royalties, diligent development, post-mining land use, and bonding. The royalty provision contained in the proposed legislation is problematic for at least two reasons. First, the eight percent royalty is too high compared to royalties paid on hard rock mineral production on non-federal lands and will make many otherwise viable mining claims uneconomical. A much lower royalty rate should be considered if royalty is an approach that is considered in legislation at all.

The second problem with the royalty provision of the bill is the problem of valuation. Valuation of coal production for royalty purposes has been the subject of study and debate for several years. The recently finalized rules for coal valuation are apparently going to be reconsidered anew even though they have just been completed. This type of prolonged debate on product valuation should be avoided in the hardrock mining area.

The provisions of the proposed legislation pertaining to diligent development are again characterized by excessive expenditure requirements. While a graduated requirement for diligent development work will encourage diligence and discourage speculation, the dollar requirements per acre contained in the bill are excessive.

The bill's requirement that all lands must be restored to a condition capable of supporting uses supported prior to mining fails to consider the lessons learned under the Surface Mining Control and Reclamation Act of 1977, or SMCRA. Even under that stringent act, alternative land uses can be approved by the regulatory authority if they represent a higher and better use of the land.

The legislation should consider at least that level of flexibility for post-mining land use. Moreover, it should not be assumed that the reclamation requirements of SMCRA can automatically be made applicable to hardrock mining. A National Academy of Sciences study in 1979 concluded that to do so would present problems of technological and economic feasibility that might well preclude many kinds of mining operations.

This committee should also recognize that the bonding requirements contained in this bill would be especially difficult for the small miner who would find that bonding will be prohibitively expensive, if it is available at all. At a minimum, alternative forms of bonding should be considered and provided for in this legislation.

Mr. Chairman and members of the committee, the concerns which I have touched upon today represent only the immediate reactions of the New Mexico Mining Association. Our principal message is that there are a number of items of critical concern which make it imperative that the committee hold further hearings on the proposed legislation; and we would request that those further hearings be held, if possible, in the field.

The Association wishes to participate in the process, in the dialogue, and in the development of any legislation which develops. And we thank the Chairman and the rest of the committee.

[The prepared statement of Mr. Roybal follows:]

Statement of

Charles E. Roybal, Executive Director
New Mexico Mining Association

On S. 1126

The Proposed Mining Law of 1989

before the

Subcommittee on Mineral Resources
Development and Production

of the

Committee on Energy and Natural Resources

United States Senate

June 7, 1989

Mr. Chairman and members of the Subcommittee, I am Charles E. Roybal, Executive Director of the New Mexico Mining Association. The New Mexico Mining Association is a non-profit trade association organized for the purpose of promoting the interests of the mining industry in the state of New Mexico. It represents 26 mining companies. These companies are involved in the mining of coal, potash, uranium, molybdenum, perlite, copper and gold. In addition, the association represents 60 associate members involved in mining support industries, and over 500 individual members from academia, government and industry.

One of the major tenets of the association is that responsible, environmentally sound development is crucial to the survival of the mining industry. We thank the Subcommittee on Mineral Resources Development and Production for the opportunity to speak to the general mining law issues which are before the subcommittee today and, in particular, to S. 1126, Senator Bumper's proposed Mining Law of 1989.

While it is quite arguable that hardrock mineral exploration and development are adequately governed under existing statutes, the dialogue regarding the Mining Law of 1872 has been initiated and we wish to participate in a reasoned discussion of possible amendments to the law which will benefit all of the national interests, including mining. These discussions are especially important as we move into the 21st century and face new needs for minerals. For example, earlier this week in New Mexico a major new find of the rare earth yttrium was announced. This type of discovery and development should not be discouraged. This nations' need for strategic minerals and for materials which will be used in new technologies, such as superconductivity, should not be impaired by well intentioned proposals to update existing federal law governing mineral exploration and production.

The proposed legislation which this subcommittee is now considering attempts to correct perceived deficiencies in current law. In addressing these issues however, the bill creates impediments which will probably eliminate the small miner as a viable actor in mineral exploration and development. The significant increased costs of mining which would be triggered by the bill will also mean that low grade ore bodies will no longer be economically viable.

Some of the specific aspects of the proposed legislation which merit special consideration and scrutiny by this committee include the provisions for royalties, diligent development, post mining land use and bonding.

The royalty provision contained in the proposed legislation is problematic for a least two reasons. First, the eight per cent (8%) royalty is much too high compared to royalties paid on hard rock mineral production on non-federal lands and will make many otherwise viable mining claims uneconomical. A much lower royalty rate should be considered if the royalty approach is implemented in this legislation. The sharing of 50% of the royalty income derived from mineral production with the States is a concept which is positive and endorsed.

The second problem with the royalty provision of the bill is the problem of valuation. The valuation of coal production for royalty purposes has been the subject of study and debate for several years. The recently finalized rules for coal valuation are apparently to be reconsidered anew even though they have just been completed. This type of prolonged debate on product valuation should be avoided in the hardrock mining arena.

The provisions in the proposed legislation pertaining to diligent development are again characterized by excessive expenditure requirements. While a graduated requirement for development work will encourage diligence and discourage speculation, the dollar requirements per acre contained in the bill are excessive.

The bill's requirement that all lands must be restored to a condition capable of supporting uses supported prior to mining fails to consider the lessons learned under the Surface Mining Control and Reclamation Act of 1977 ("SMCRA"). Even under that stringent act alternative land uses can be approved by the regulatory authority if they represent a higher and better use of the land. This legislation should consider at least that level of flexibility for post mining land use. Moreover, it should not be assumed that the reclamation requirements of SMCRA can automatically be made applicable to hard rock mining. A National Academy of Sciences study in 1979 concluded that to do so would present problems of technological and economic feasibility that might well preclude many kinds of mining operations.

This committee should also recognize that the bonding requirement contained in this bill will be especially difficult for the small miner who will find that bonding will be prohibitively expensive, if it is available at all. At a minimum, alternative forms of bonding should be considered and provided for in this legislation.

The concerns which I have touched upon today represent only the immediate reactions of the New Mexico Mining Association to S. 1126. The bill has not been available long enough to permit the full analysis which it deserves. Our principal message is that there are a number of items of critical concern which make it imperative that the committee hold further hearings on the proposed legislation. The Association wishes to participate in the dialogue regarding the mining law which is developing.

Senator **Bumpers**. Thank you, Mr. Roybal.
Mr. Neff.

STATEMENT OF JOHN L. NEFF, SECRETARY, NORTHWEST MINING ASSOCIATION

Mr. **Neff**. Mr. Chairman and members of the committee, I am here for the Northwest Mining Association. Although I am a private practitioner and have been for 30 years, I have been involved with the Northwest Mining Association for 20-some odd years as kind of the unpaid consultant. I do not charge them.

The Association itself represents perhaps the most diverse group in mining currently operating as a major organization. We do not really represent major companies. We are small operators or promoters. It is primarily directed entirely toward attempting to maintain some stability and some honesty in the mining process.

We have been faced with, obviously, like the rest of the exploration people have, with the problem of the unscrupulous, the gentlemen who will file notices of location with no corners in place, with the people who file assessment work when they have not done it. But we have, over the years, developed a lot of interest and a lot of continuity in the study of the process and the application of the law.

I think we are here basically kind of with a feeling like the old New York surrogate judge that says no man's life, liberty, or property is safe while the legislature is in session. And we kind of feel that about any opening up of the Mining Law at this time, because it does work, and there are no major problems.

We do have the problem of the transition that has gone on in the state legislatures of being the primary source of protection of prediscovery possession, which now is operating in states such as Idaho and Washington, possibly Oregon, and is not operating in Nevada, Arizona, California and Montana, all of whom have amended their laws since the early days to provide that a state discovery requirement on federal land is a requirement. This has disrupted the entire process of relative rights of possession prior to discovery, which was being effectively carried on for 100 years under that program.

Our suggestion is—and it is in the written statement that is submitted—but the suggestion is that the Secretary of the Interior should now, belatedly, at this late date, take on the function of at least defining by regulation the method of marking a claim, monumenting it, what is required to be in the notice of location, required to be filed with the Federal Government, which is not currently a problem or is not currently provided for. And the same is true with the annual proofs of labor, leaving it not to build another administrative structure to supervise all of this, but leave it up to the statutes that are in place for enforcement of perjury basically to require proper filing and details in these documents. If this is done, I predict that we will see an elimination of probably at least half to two-thirds of the mining claims that are currently being maintained, and then the problem will become manageable and can be attacked as something to work with.

We anticipate in our area—we have now, I think the testimony was, 1,200,000 claims, and I think our guess is more like 1,250,000 claims being maintained. In those claims, a lot of which are specious, some of which have significant value, we have literally millions of people who think they have a vested interest. I would suggest that if any precipitous change in this is going to precipitate a lot of litigation, perhaps as a practitioner of the law I would look forward to that, but I do not. I think it is silly to precipitate that type of a conflict, disappointing people who think they own something, which the law really says they do not. There has never been any question that they had anything of value, except that they persist in listing these claims, and offering circulars and perspectuses on company property rolls and other things where there is really nothing there to protect.

I have argued with the BLM people about this a number of times, of whether or not the answer is to thin down the number of those that are legitimately there, who are attempting to in good faith comply, to get rid of this fluff of all of the large number of people who really have speculative claims before we attempt to make any modifications in the basic system.

The modifications, if they come, I find objectionable that some of the proposals that have been made basically are going to turn the whole thing into a concession system in which only the high and the mighty and the wealthy can operate. We eliminate the small operators, the small organizations that have been doing a yeoman job in finding mineral and bringing it to the point where it can be produced. Any system that loads up costs on it, that makes it more difficult in the area of getting possession without proof of discovery of mineral, any change of that nature is simply going to play into the hands of the big companies. It is as simple as that.

My suggestions at this point are simply—really, there is no change that should be made, or certainly not without some changes in some major considerations, not the least of which is our long-term mineral supply vis-a-vis domestic versus foreign, because very simply, we do not supply our system.

Thank you.

[The prepared statement of Mr. Neff follows:]

STATEMENT OF

JOHN L. NEFF

Northwest Mining Association

Subcommittee on Mineral
  Resources Development & Production
Committee on Energy &
  Natural Resources
United States Senate
Washington, D. C.

Gentlemen:

The Subcommittee has graciously agreed to permit testimony by the Northwest Mining Association in regard to a proposal to adopt the "Mining Law of 1989," and I have been designated to speak on behalf of the Association. The Association is the largest mining association in America that is not limited in scope to the interests of specific segments of the mining industry, and among its members are individuals and companies with diverse interests in the mining industry. The Association itself has attempted at all times not to become beholden to any specific point of view, and has had to deal with conflicting points of view. The Association's interest as an organization is in maintaining an effective and efficient mining industry in the western states, and particularly the area of its charter, the northwest states and Alaska.

I was selected as the spokesman for this hearing because I am a lawyer with a background as a graduate mining engineer. I have practiced law for over 30 years representing, at various times, almost every segment of the industry, from prospectors to operating companies to international mining corporations. In the process of this, and through matters relating to research and writing, I have developed a broad grasp of the history and current condition of the state of law and regulation as it relates to mining upon federal lands.

In approaching any legislative changes under the present program controlling mining upon federal lands, that are almost entirely restricted to the western states and Alaska, unlike some commentators with idealized conceptions of a system of mining laws that might apply if there had never been any mining laws, I fully recognize that the systems of laws and regulations under which the mining industry is operating on federal lands that are federal, or that were once part of the public lands, has a long history that cannot be ignored.

According to the statistics published by the Bureau of Land Management the federal government, under titles variously derived by treaty, retains 726,685,764 acres out of total area in the United States of 2,271,343,368 acres, including the 50 states. Of course most of this acreage is in the western states, and represents a percentage exceeding 85% of total area in the states of Nevada and Alaska, and represents more than 30% of the land area in the states of Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming, and just a fraction less than 30% of the State of Montana. In addition to this acreage, the federal government retains ownership to minerals reserved in approximately 33,000,000 acres patented under the Stockraising Homestead Act of 1916, that was last defined by the U. S. Supreme Court in Watt v. Western Nuclear Company in 1983 to include all minerals, including sand and gravel. Approximately one-third of the federal lands are still open to location of mining claims, the balance having been withdrawn or otherwise made unavailable for claim location under the federal and state mining laws. Approximately 1,250,000 mining claims currently are being maintained according to filings made of record with the Bureau of Land Management under Section 314 of the Federal Land Policy and Management Act of 1976 within the remaining third of the federal lands available for location of claims. This encompasses an apparent claim position maintained by someone feeling there is enough value to maintain current status of approximately 25,000,000 acres, which, if consolidated, is an area approximately the size of the State of Virginia. Out of the operation of the claim laws, and the patenting procedures, in recent decades approximately 15,000 acres per year are being processed to mineral patent under the mining laws, much of which is for minerals not locatable since 1920 or 1955. There is no indication that the disposition of federal lands in this manner has accelerated in recent years, and in fact has been steadily declining, interrupted only by such one-time events as the patenting of pre-1920 oil shale claims. This is a miniscule impact upon the federal holdings.

This hearing was scheduled for the purpose of testimony upon a bill relating to mining law that had not been introduced as of two days prior to the hearing. I have assumed that the hearing is really involved with the basic question, should any legislation be enacted at this time affecting the claim location system that has been in operation on federal lands for over 135 years, or whether instead the problems that exist should not be resolved under the existing statutory framework. The problem that exists, as I see it, is that the federal government has never undertaken to manage the minerals in the federal lands, except to the extent that consideration of minerals has been withdrawn from the claim location system, subject only to disposition by lease or sale. This is in spite of the fact that the Commissioner of the General Land Office, whose functions were transferred to the Bureau of Land Management under the Reorganization Plan of 1946, has since

1878 had the statutory authority to "enforce and carry into execution by appropriate regulations . . ." all statutes relating to the federal lands. It is recognized that because the Commissioner of the General Land Office was remiss in preventing massive trespasses upon federal timber holdings, the U.S. Forest Service was created and its functions transferred to the Secretary of Agriculture under President Theodore Roosevelt. The General Land Office, and its successor, the U.S. Bureau of Land Management, within the Department of the Interior, has been equally remiss in administering the disposition of minerals under the claim location law, at least prior to actual survey and application for patent to mining claims.

In approaching the questions of serious revision or elimination of the claim location system, in the words of the late Congressman Compton I. White, of Idaho, it is necessary to "start from where you're at." The federal lands, at this late date, are hardly virgin territory, and have been chopped up by numerous land disposition statutes, possibly exceeding 2,000 in number. Under the location law itself the public believes that literally hundreds of thousands of people have rights initiated under that law. To an unfortunate extent this has been the product of inattention by the federal land agencies, that have deferred almost totally to concurrent jurisdiction of the states, and prior thereto the territories, to enforce any compliance with the standards to be applied in claiming or maintaining interests under the location laws, at least prior to the point that an application for patent had been filed.

In determining "where we're at" under the location system, a brief historical recital is in order. In the Continental Congress the question was raised of whether or not rights of squatters would be recognized to give any pre-emptive rights in the land west of the Allegheny Mountains that were relinquished by the original colonies. The answer at that time was no. By the time vast areas of land had been acquired by treaty and by appropriation in the west, the answer became yes. Under the Pre-emption Act of September 4, 1841, occupants of any public lands were given pre-emptive rights to acquire those lands, even though their occupation was technically a trespass at the time of enactment of the Act. The relative rights of possession between conflicting occupants was left to regulation by the territorial legislatures and by the territorial courts. The same concept was carried over into the laws of California, at its first legislative session as a State, that claims of mineral land, and the relative rights to possession (including mining) arising out of those claims was to be resolved by the "laws of possession." This was construed to mean, in California, the enforcement of the regulations adopted by individual mining camps that defined which individual had the prior right to possession. These claims were obviously upon federal land, and the federal government avoided adopting any procedure to control occupants of previously unoccupied lands.

The concepts of the early mining camps and the California legislature were carried into enactments by the territorial legislatures in the territories of Arizona, Oregon, Idaho, and Nevada. These were all enacted in 1864, two years before the first federal enactment on mining claims. The important part of this discourse is that the pattern that was developed at that time, of concurrent jurisdiction of the states and the federal government in controlling possession and the right to possession on mining claims on federal land continues to the present time. Each of the western states has specific enactments by state law, regarding location of mining claims, all of which are located upon federal lands. The regulation of marking of boundaries, evidence of assessment work, the decision of whether or not some evidence of location in the nature of a discovery shaft or pit, have all been controlled by state legislation, in the absence of any detailed federal regulation upon the subject. The recent court opinions reflect that the states are free to regulate possessory activities upon federal lands so long as the regulation does not impinge upon the free right to prospect and locate claims decreed by the federal statutes.

Since enactment of the federal claim laws, there has been extreme reluctance upon the part of the Department of the Interior, although it has had the clear statutory authority, to regulate the initiation of claims under the mining laws, including marking, assessment work, and other activities that have and do take place prior to actual application for title by patent. With certain exceptions the Department of the Interior in administering the location laws has chosen instead of enacting regulations, to create internal policy, subject to change from time to time, under which it will seek to obtain rulings by adjudication before the Interior Board of Land Appeals, or in court. This has had some advantages because it has left some flexibility in development of what has become a system of stare decisis rather than a system of rules and regulations.

Prior to the adoption of the Multiple Surface Use Act, effective July 23, 1955, the Bureau of Land Management limited its regulations to proceedings leading to and covering patent procedures, and to administration of the Mineral Leasing Law of 1920. The Multiple Surface Use Act had the effect of not only withdrawing from claim location many minerals that had been previously locatable, the so-called "common varieties," but also provided that claims should not be used, prior to patent, for any purpose other than prospecting, mining or processing operations and uses reasonably incident thereto. In addition, the right to manage and dispose of vegetative resources and mineral resources, other than locatable minerals, prior to patent, was reserved to the administrative agency.

Based upon the Multiple Surface Use Act of 1955, and other asserted authority, the U.S. Forest Service adopted regulations in 1974 establishing, in detail, the limitations upon operations affecting surface resources, without any relationship to the right of the operator to be on the federal lands at all. The regulations assume the right to be there by reason of the provisions of the location laws and the concurrent state regulations of rights to possession. In 1980 the Bureau of Land Management went the U.S. Forest Service one better by adopting parallel regulations for lands under the administrative jurisdiction of the Bureau of Land Management, again limited to regulation of surface activities.

Belatedly, in 1970, the Bureau of Land Management adopted minimum regulations regarding location of mining claims and assessment work. In these regulations the Bureau of Land Management again deferred to state or territorial laws and local rules and regulations regarding size of claims, and recording of location notices. The regulations that were adopted did not contain any enforcement procedure, or even any procedure for filing with the Bureau of Land Management, either notices of location or evidence assessment work has been done as required by law. Belatedly again, in the Federal Land Policy and Management Act of 1976 a filing requirement was included, but the filing that is permitted under that statute is the adoption of the filings required by the state statutes, simply requiring filing with the Bureau of Land Management in addition. The information disclosed in these filings has not been the subject of any major enforcement activity by the Bureau of Land Management, even though the information disclosed, in many instances, clearly reflects that the claimants are not complying with the location law or the 1970 regulations. The federal government has relied totally upon the assertion of concurrent jurisdiction by the states in regard to all of these matters. During this period of time the states have experimented with various forms of monumenting a claim, with the long-standing requirement of visual proof of location by sinking a shaft or making an excavation (eliminated in recent years in every state), limitations upon block-filing of assessment work, affidavits regarding maintenance of location boundaries, proofs of labor in the form of affidavits filed in the public records, with consequent results for non-compliance, and virtually every other aspect of the procedures to be followed in locating and maintaining a claim to the point of application for patent. The federal government has confined its concern to the determination at the point of application for title, except for occasional proceedings to contest use and occupancy for purposes other than prospecting, mining or processing operations.

Anyone knowledgeable about the operations of the public and the mining community under the location laws will have to concede that failure to clearly mark the boundaries of claims upon the ground is endemic, and the compliance with the assessment work requirement is deficient to the point of being scandalous. Since all of this has taken place during the period of clear regulatory authority of the Secretary of the Interior, I fail to see how any act of Congress could change the inaction of the Secretary of the Interior in carrying out his statutory duties. The Northwest Mining Association stands ready to assist the Secretary in formulating a responsible regulatory scheme in regard to all matters of the physical acts of location of mining claims, marking boundaries, and maintenance of good-faith assessment work on those claims. I personally believe that any serious attempt by the Secretary of the Interior to require compliance with the location laws would drastically reduce the number of "claims," leaving only the responsible members of the mining community in possession of claims.

This hearing has been convened for the purpose of taking testimony regarding a proposal, in its infancy, that would effectively eliminate a substantial part or all of current mining activity on federal lands. However, it does not deal with the mining that is being conducted under various leasing laws and on properties that the federal government no longer owns, but that it has in some instances asserted jurisdiction under the Property Clause of the Constitution, even though not in federal ownership. The best that can be said for the proposal is that it is like the proverbial bull in the china shop, and would accomplish results not contemplated, without evaluation of the drastic effects of precipitous action. The position of the Northwest Mining Association is that whatever problems exist in the administration of the mining industry on public lands, are not serious problems, do not deserve the attention of Congress at this time, and certainly are complex enough that simply lowering the horns and charging is inevitably going to create massive chaos. If in fact there is an aura of problems that deserve to be on the agenda of Congress, because of the complex relationship of federal and state statutes, federal regulations, state regulations, and a history of 125 years of judicial and administrative adjudications, the entire subject deserves study by an outside commission of responsible persons, to study the specific issues of:

1. Whether or not any change would materially impact upon the essential mineral supplies of the United States. This is particularly important because the United States has become a "beggar nation" in regard to most minerals being produced from the federal lands, and has not developed the international political expertise to assure continuity of supply from foreign sources.

2. The effect of any increased cost factor affecting existing or prospective mining

operations upon the public lands, and particularly the effect upon recoverable economic deposits, that might become uneconomic if the costs are increased. This is basically a conservation question of whether or not the effect of increasing costs, whether by rentals, royalties, surcharges, taxes, or other exactions, will in effect make much existing material unrecoverable, both now and for all time to come.

3. The effect of any specific change in the tenuous balance between the monolithic, large mining corporations, and the individuals and small organizations currently involved in the mining activity upon federal lands. In other words, systems that are restrictive upon the persons who can prospect, and upon the persons who can afford to pay for the privilege, or the privilege of operating under the system in effect, really convert the entire program to one of something comparable to a Latin American concession system, a system with which Europeans are most comfortable. The question is one of can a system more favorable to the large exploration corporation be established that still protects the individual and small organization entrepreneur.

The complexity of the entire subject requires that detailed review by knowledgeable persons be completed prior to adoption of any concept that is adopted on the basis of "improving" the system. The Association suggests an independent commission, funded by Congress, headed by the Director of the Bureau of Mines, or his designee, as chairman, or co-chairman, composed of a limited number of persons charged with the authority to develop a detailed report to Congress, with specific recommendations regarding the desirability of changes in the existing system of regulation of mining activity upon the federal lands. A majority of this Commission should be appointed from the private sector in order to prevent a "made as instructed" report from agency personnel.

I would urge this Committee, and Congress, not to consider any statutory enactments that would have far-reaching effect without prior detailed evaluation by a study commission that should involve the public, and particularly the knowledgeable public involved in the mining industry. Proceeding without requisite information will justifiably be criticized as irresponsible.

Respectfully submitted,

John L. Neff

John L. Neff

Senator Bumpers. Thank you, Mr. Neff.
Mr. Langley.

STATEMENT OF GARY LANGLEY, EXECUTIVE DIRECTOR, MONTANA MINING ASSOCIATION

Mr. Langley. Mr. Chairman, members of the subcommittee, for the record my name is Gary Langley. I am Executive Director of the Montana Mining Association.

The membership of the Montana Mining Association consists of the following: about 45 corporations that are either actively mining in Montana or exploring for minerals in Montana.

Senator Bumpers. How many?

Mr. Langley. There are 45, sir.

About 300 small-scale prospectors and miners, and about 300 suppliers of goods and services to the mining industry.

Miners in Montana are producing gold, silver, platinum, palladium, copper, and many base metals. Nonmetals being produced in Montana are vermiculite, talc and phosphate. Together, these mines employ about 3,600 people who collectively earn about $145 million a year.

We do not believe that any wholesale changes in the 1872 Mining Law are needed either to enhance government revenue or to protect the environment. Each of the mines operating in Montana has gone through an extensive, site-specific permitting process. Each of these mines is conducting its operation with pride, with social awareness, with environmental concern, and in compliance with the 37 federal and 11 state laws that regulate the mining industry. When the mining is finished, each of these mines will be reclaimed.

Mining in Montana, which has occurred since gold first was discovered in our state in 1858, left an historic legacy of environmental neglect and in some cases abuse; but modern mining should not be judged on perceptions of the past. In Montana, environmentally sound and socially conscious mines are the rule, not the exception. Sensational media and biased government reports to the contrary, Montana's mining community is proud of its record of anticipating public concerns and responding to them before they become public policy problems.

In 1986, at the initiation of the Montana Mining Association, legislation was enacted requiring owners of patented mining claims to sign affidavits testifying that these claims are being held exclusively for mining purposes. Unless these affidavits are signed under the penalty of swearing to a false statement, these claims are taxed as suburban tracts and are ineligible for the much lower tax treatment accorded mining claims. This year, at the initiation of the Montana Mining Association, legislation was enacted to require small-scale placer miners to post bonds and to reclaim their operations, even if they fall under the small miners exclusion.

Another bill was passed to require all miners, even those operating under small miners exclusions, to file plans of operations and reclamation and to post bonds for any ore processing facility using cyanide. Thus, we believe adequate reclamation is occurring under the discretionary bonding authority of Federal agencies and the statutory authority of the state.

Next I would like to address the royalty provision of the bill, which apparently I do not believe has been addressed significantly today. Now, this proposed legislation appears to be a revenue enhancement measure for the state and Federal Governments, apparently assuming that mining companies pay little or nothing to the public welfare in return for the extraction of minerals.

Montana mining companies, in fact, pay millions of dollars to support state, local and Federal Governments. A typical mine—now, this is an actual case study, but I am prevented by confidentiality from releasing the name of the mining company—has been in operation in Montana for eight years and has paid the following taxes: $8 million in local and state severance taxes—that is a tax that no other business, no other industry in Montana pays—$8 million in state and local property taxes; $22 million in state and Federal income taxes. Assuming the mine stays in production another five years, state, local and Federal Governments can expect another $12 million to $13 million from the mine. An 8 percent royalty would cost this mine an additional $4 million a year. Now, that is going to mean the difference between a profit and a loss, the difference between an operating mine contributing to the community, the state, and the Nation, or a closed mine contributing nothing to the public well being. Statewide, the persons employed by mining companies operating in Montana collectively pay $5 million in state income taxes and $12 million in Federal income taxes.

The current law, in context with other Federal and state statutes is working. There is no need to change it.

Thank you very much for the opportunity, and I would be happy to answer any questions.

[The prepared statement of Mr. Langley follows:]

JUNE 7, 1989

TESTIMONY OF THE MONTANA MINING ASSOCIATION BEFORE THE SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION OF THE SENATE ENERGY COMMITTEE SUBMITTED BY GARY A. LANGLEY, EXECUTIVE DIRECTOR

Mr. Chairman, Members of the Subcommittee:

For the record, my name is Gary Langley. I am Executive Director of the Montana Mining Association. The Montana Mining Association is a trade association that represents the mining industry in government and public affairs. Its membership consists of the following:

1) About 45 corporations that are either actively mining or exploring for minerals in Montana;

2) About 300 small-scale prospectors and miners;

3) About 300 suppliers of goods and services to the mining industry.

Miners in Montana are producing gold, silver, platinum, palladium, copper, and many base metals. Non-metals being produced in Montana are vermiculite, talc, and phosphate. Together, these mines employ 3,600 Montanans who collectively earn $145 million per year. In the metals segment of the industry, 2,400 persons earn $100 million a year. The 1,200 persons employed in the non-metals sector of the industry account for $45 million in labor income a year.[1]

Changes in the 1872 Mining Law are not needed to either enhance government revenue or to protect the environment.

Each of the mines operating in Montana has gone through an extensive and site-specific permitting process. Each of these mines is conducting its operation with pride, social awareness, environmental concern, and in compliance with the 37 federal and 11 state laws that regulate the mining industry in order to protect the environment. When the mining is finished, each of these mines will be reclaimed. Each of the 3,600 persons who work in Montana's mining industry care about Montana's scenic beauty and recreational opportunities. They have built homes, are raising families, and are contributing to the building of churches and schools in Montana. Their social and recreational values are no different than those of the non-mining public.

Mining in Montana, which has occurred since gold was first discovered in our state in 1858, left an historic legacy of environmental neglect and, in some cases, abuse; partly because technology was not available to correct the temporary disturbances caused mining and partly because public environmental concern at that time was not sufficient to require measure to protect the environment. But modern mining should not be judged on perceptions of the past. In Montana, environmentally-sound and socially-conscious miners are the rule, not the exception.

In the past year, two mining companies seeking permits in environmentally sensitive areas have been cited by the U.S. Forest Service for their willingness to mitigate potential environmental problems. One of these mines is currently in operation, producing platinum and palladium--the only producer of this strategic metal in North America--just a few miles from one of Montana's most scenic wilderness areas. Later this year, the second mine will begin producing gold, also near one of Montana's most scenic areas and most popular resorts.

Sensational medial and biased government reports to the contrary, Montana's mining community is proud of its record of anticipating public concerns and responding to them before they become public policy problems. Some of the mining industry's recent actions address provisions of the bill currently under consideration by this Subcommittee and contentions put forth in recent government reports pertaining to the 1872 Mining Law.

In 1986, at the initiation of the Montana Mining Association, legislation was enacted requiring owners of patented mining claims to sign affidavits testifying that these claims are being held exclusively for mining purposes. Unless these affidavits are signed, under the penalty of swearing to a false statement, these claims are taxed as suburban tracts and are ineligible for the much lower tax treatment accorded to mining claims.

This year, at the initiation of the Montana Mining Association, legislation was enacted to:

1) Require small-scale placer miners to post bonds and reclaim their operations, even if they fall under the small miner's exclusion;

2) Require all miners, even those operating under the small miner's exclusion, to file plans of operation and reclamation and to post bonds for any ore processing facility using cyanide.

These incentives were taken by Montana's mining community to assure that the impact of small miners on the environment remains small.

Thus, we believe adequate reclamation is occurring under the discretionary bonding authority of federal agencies and the statutory authority of the state. Current bonding requirements also consider the limited financial resources and technology available to small miners who, in many cases, are responsible for the initial discoveries of the technologically-sound and environmentally-compatible mines in operation today. It is one thing to respond to legitimate public concerns and quite another to make it financially prohibitive for an important segment of the industry to function. No additional bonding is necessary to protect the environment.

The proposed legislation also appears to be a revenue enhancement measure for state and federal governments, apparently assuming that mining companies pay little or nothing to the public welfare in return for the extraction of minerals. Montana mining companies, in fact, pay millions of dollars to support local, state, and federal governments.

A typical mine that has been in operation in Montana for eight years has paid the following taxes:

1) $8 million in local and state severance taxes;

2) $8 million in state and local property taxes; and

3) $22 million in state and federal income taxes.[2]

Assuming the mine stays in production another five years--a conservative estimate of its life span--state, local, and federal governments can expect another $12-13 million in revenue from the mine. Moreover, this mine employees more than 300 persons who have collectively earned nearly $70 million in wages during the past eight years.

A five percent royalty would cost this mine an additional $2.5 million a year, which could mean the difference between a profit and a loss, an operating mine contributing to its community, state, and nation, or a closed mine contributing nothing to the public well-being.

Statewide, the persons employed by Montana mining companies collectively pay $5 million in state income taxes and $12 million in federal income taxes on salaries ranging from $30,000 to $40,000 a year.[3] If excessive taxation in the form of royalties forces Montana's mines to close--or, at the very least, shortens their life spans--these people will not work or pay income taxes on high salaries.

Excessive taxation also will preclude future investment in Montana. A joint venture project currently on the drawing board will represent a $320 million initial investment in Montana. Once in operation, it will employ 450 persons during its first 15 years of production and pay $100 million in local and state taxes and $150 million in federal taxes.[4] An excessive federal royalty could scuttle the project. The result: No jobs, no taxes.

Clearly, the proposed legislation does not consider the unique nature of the mining industry or its contribution to Montana or the nation.

The current law, in context with other federal and state statutes, is working. There is no need to change it. Under the present system of laws, Montana's mining industry can continue to contribute to local, state, and federal economics and produce the minerals needed by the world with environmental responsibility and social concern.

Thank you for the opportunity to allow the Montana Mining Association to express its views.

REFERENCES

[1] Montana Bureau of Business and Economic Research.

[2] An actual case study. The mining company, however, wishes to remain unnamed to protect its confidentiality.

[3] Figures supplied by the Montana Department of Revenue and the accounting firm of Galusha, Higgins and Galusha, based on a family of four taking standard deductions.

[4] The Montana Project, Thompson Falls, Montana; taken from a speech delivered by Frank Duvol, President, Montana Reserves, at the annual convention of the Montana Mining Association, May 10, 1989.

Senator **Bumpers**. Thank you, Mr. Langley.

Mr. McVee.

STATEMENT OF CURTIS V. McVEE, EXECUTIVE DIRECTOR, ALASKA MINERS ASSOCIATION

Mr. **McVee**. Thank you for the opportunity to testify. I might point out if you were working for a mining company, you would be on overtime and you would circulate that into the economy.

A little of my history. Prior to 1984 I spent 34 years with the BLM, with the last 13 years as State Director in Alaska. Early in my career I worked on the regulations for phosphate mines in Idaho. I have been Executive Director of the Miners Association for the last three.

I have found the 1872 Mining Law to be a dynamic vehicle which has accommodated the philosophies and requirements of new laws including FLPMA and NEPA. For example, the regulations contained in 43 CFR modernize processes to accommodate these changes. Also, earlier witnesses said there was no place in the process to say no. I would like to point out in the planning process of both BLM and the Forest Service when resource is evaluated in the multiple use plans, decisions are made as to the allocation of lands for specific purposes. At that point mining can be closed off.

Under this bill the time requirements, cost, reclamation requirements combined with the high risk and front end costs associated with delineating an ore deposit and developing a mine will discourage investments by both large and small operators in mining on public lands in Alaska. The small family mines will not be able to function. Front end cost as well as time constraints will preclude the typical hard working individual prospector from pursuing mineral deposits on federal lands. The family mine, and there are still several hundred in Alaska, will probably over time fade into history. Also, the State of Alaska now collects up to a seven percent royalty on production. On top of other taxes, another eight percent would make many claims uneconomic.

It is not unusual for the time between initial discovery and production to span 15 to 20 years. Over this time local and world metal markets can fluctuate due to demand as well as political influences. All this time the developer is continuing to delineate and evaluate the ore body assuming that future markets will justify these risks and provide a just reward. Conditions are compounded in the Arctic because of our very short seasons, maybe only 60 or 90 days to explore.

To understand mining and the laws and regulations applicable to federal lands, it is necessary to look comprehensively at the industry. An essential component of any analysis is the economic implications of various proposals. This is typically done by developing a variety of economic scenarios and playing proposed cost data to evaluate the results. This technique is used in Environmental Impact Statements, in recent legislation in Alaska which established a rent and royalty system for state lands and in the Environmental Protection Agency's "Effluent Guidelines for Placer Miners."

There are compliance problems under the existing law, and I would propose that these could be corrected through administrative policy. I would suggest that your attention to this whole matter and the GAO report has sensitized the agencies to review their processes and criteria.

The idea of incentives have served our nation well, encouraging the investment of time, private capital to identify and develop mineral deposits on federal lands. We would submit that such incentives are more acceptable than the immense subsidies associated with the agricultural programs. The public is renumerated through jobs, increased tax base and other revenues in addition to the metals made available from U.S. sources which do not contribute further to our balance of payments problems.

Please recognize that existing environmental controls and their costs imposed on all mining ventures during all phases. They originate from local and state government as well as federal. On federal lands they require mining and reclamation plans, water discharge and quality permits, controls on hazardous waste, fuels and explosives. In Alaska there are permits required from the Alaska Department of Fish and Game, from the Department of Natural Resources and the Department of Environmental Conservation.

Since much of Alaska is wetlands caused by a high water table created by the perafrost conditions, wetland permits are required. In addition, in all the costal management areas, which extend inland for over 200 miles in many instances, the local coastal management districts must review all applications.

Another thing, the new law will destroy the years of effort expended by both mining industry and government to clarify, interpret and establish the precedence which now guide the Administration on the Mining Law. These were established through costly, time consuming litigation and administrative appeals. Industry would have to face years of uncertainty if this new law were passed. Uncertainties will reduce investments of mining capital in the U.S. driving it to Brazil, South Africa, Australia, and so on.

Please remember that concentration of minerals which will justify the cost associated with their extraction are very rare. They occupy only small acreages. The world class Red Dog zinc, lead deposit takes up about 600 acres. The total development at the Greens Creek Mine, another world class silver, zinc mine, takes up about 130 acres. In Alaska an appreciable cost of developing and operating these deposits is access.

The Alaska Miners Association recommends a thorough in depth study of all the issues by knowledgeable and competent people. We are convinced the problem with the 1872 law can be addressed largely by administrative action. Thank you very much.

[The prepared statement of Mr. McVee follows:]

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TESTIMONY ON "MINING LAW OF 1989"

SENATE SUBCOMMITTEE ON MINERAL RESOURCE DEVELOPMENT & PRODUCTION

CURTIS V. MCVEE, EXECUTIVE DIRECTOR

ALASKA MINERS ASSOCIATION

JUNE 7, 1989

The Alaska Miners Association represents the placer, hardrock and coal miners, also professionals and support industries. Our organization has just completed its 50th year as a non-profit organization working for the mining industry in Alaska.

I might provide a little of my history so you know the background for these comments. Prior to 1984 I spent 34 years with the BLM in Alaska, Washington, DC; Nevada, Montana and Wyoming in various assignments, with the last 17 years in Alaska and 13 of those as the BLM State Director. Earlier in my career, I worked on the regulations for the phosphate mines in Idaho. For the last three years, I have been employed as Executive Director of the Alaska Miners Association. Watching and being involved in the legal/regulatory process from various perspectives, I have found the 1872 Mining Law to be a dynamic vehicle which has accommodated the philosophies and requirements of new laws including the Federal Land Policy and Management Act and National Environmental Policy Act. For example, the regulation contained in 43 CFR 3809 set up the requirements for a mining plan and modernized processes to accommodate changes.

The proposed legislation titled the "Mining Law of 1989" would destroy the future of the mining industry on public lands in Alaska. The time requirements, costs, reclamation requirements combined with the high risks and front end costs associated with delineating an ore deposit and developing a mine, will discourage further investments by both large and small operations in mining on public lands in Alaska. The small family mines will not be able to function under this law. Front end cost as well as the time constraints will preclude a hard working individual prospector from pursuing mineral deposits on Federal Lands. The family mine as we know in Alaska, and there are still several hundred, will fade into history. Also the State of Alaska now collects up to 7% royalty on all production with an additional 3% added by the 1989 legislation. Another 8% would make any claim uneconomic.

It is not unusual for the time between initial discovery and production to span 15 to 20 years. Over this time local and world metal markets can fluctuate due to demand as well as political influences. All this time the developer is continuing to delineate and evaluate the ore body assuming that future markets will justify these risks and provide a just reward. Conditions are compounded in the Arctic where seasons are short and field activities can only be conducted for three or four months.

To understand mining and the laws and regulations applicable to Federal Lands, it is necessary to look comprehensively at the industry, at the requirements now placed on the industry by not only Federal but State and local government. An essential component of any analysis is the economic implications of various proposals. This is typically done by developing a variety of economic scenarios and playing proposed cost data to evaluate the results. This technique is used in Environmental Impact Statements, in recent legislation in Alaska which established a rent and royalty system for State lands and in the Environmental Protection Agency's "Effluent Guidelines for Placer Mines". In addition, the technical variations of geology and metallogeny must be recognized in the analysis of costs. The recent GAO report failed miserably in this regard other than to indicate that in a few instances the patenting process transferred some valuable land into private ownership where it was placed on the tax rolls and developed for other than mining purposes. If this is the problem, then let us concentrate our efforts to resolve this, not destroy an entire industry. If there are compliance problems or misuse of the patent provisions which are now in use these can be corrected through administrative policy and more attention by the agencies adjudicating applications for patent. I would suggest that your attention to this whole matter and the GAO report have sensitized the agencies to review their processes and criteria.

Opponents of the 1872 Mining Law decry as unrealistic the $2.50 per acre payment made to the U.S. Government before a patent is issued. For any claim thousands of dollars are spent, circulated into the local economy over many years prior to patent.

The idea of incentives have served our nation well, encouraging the investment of time and private capital to identify and develop mineral deposits on federal lands -- the idea of self-initiation. We would submit that such incentives are more acceptable than the immense subsidies associated with agricultural programs. The public is renumerated through jobs, increased tax base and other revenues in addition to the metals made available from U.S. sources which do not contribute further to our balance of payments problems.

Recognize the existing environmental controls and their costs imposed on all mining ventures during all phases. These controls originate from local and State Government as well as Federal. Mining activities on public lands require mining and reclamation plans, water discharge and quality permits, controls on hazardous waste, fuels and explosives. In Alaska there are permits required from the Alaska Department of Fish and Game, from the Department of Natural Resources and the Department of Environmental Conservation. Also, since much of Alaska is wetlands caused by a high water table created by the permafrost conditions, Corps of Engineers wetland permits are required. In addition, in all the Coastal Management Areas, which extend inland for over 200 miles in many instances, the local Coastal Management Districts must review all permit applications.

A new law will destroy the years of effort expended by both the mining industry and government to clarify, interpret and establish the precedents which now guide the administration of the Mining Law. These were established through costly, time-consuming litigation and administrative appeals. Industry would again have to face years of uncertainty if this new law were passed. Uncertainties which will reduce investment of mining capital in the U.S., driving it to Brazil, South Africa, Australia, etc. Projects would be halted pending court decisions and appeals. This pattern is well established. Look at the ten years of appeals and litigation which followed passage of the Native Land Claims Act and held up implementation.

I would urge you not to use the GAO report as a basis for making any kind of conclusions on the industry. It is very shallow, incomplete and in error. The American Mining Congress report of May 1989 provides an excellent critique.

Please remember that concentrations of minerals which will justify the cost associated with their extraction are very rare. Also they occupy only small acreages. The world class Red Dog zinc lead deposit takes up about 600 acres. The total development at the Greens Creek Mine, another world class silver, zinc mine takes up about 130 acres. In Alaska an appreciable cost of developing and operating these deposits is access. The Red Dog Mine is 90 miles northwest of Kotzebue, about 52 miles from the coast and development requires a road, a port facility and a camp for the mine workers. Access is generally a problem to all of Alaska's ore deposits.

The Alaska Miners Association recommends a thorough in-depth study of the issues, by knowledgeable and competent people. We are convinced that problems with the 1872 Law can be addressed by administrative actions. We strongly recommend against this proposed "Mining Law of 1989".

Senator **Bumpers**. Thank you, Mr. McVee. Senator McClure.

Senator **McClure**. One thing that I have heard almost uniformly is that bonding requirements for reclamation are very expensive, very difficult, and often times out of the reach of small miners. Mr. Smith, I see you nodding your head. Has that been your experience, or is that your concern?

Mr. **Smith**. When the Organic Act came out in 1966, that's when this Citizens for Mining got formed, and we took all those issues to task then. We could not find any company that would bond a little miner, so that come down to you paid cash out of your pocket. I see no reason for it changing today. I've never bothered to check, but we have been through it once.

Senator **McClure**. Mr. Langley, you indicate that the State of Montana has just initiated a bonding requirement, am I correct?

Mr. **Langley**. Yes, Senator McClure. What we did, particularly in the case of small miners, there was an environmental problem there that we felt should be addressed. We limited the bonding requirement to $5,000 per site. We also gave the Department of State Lands, which is the regulatory agency, the authority to collect any reclamation cost over and above that $5,000, but we tried to make the up front reclamation bonding as minimal as possible.

What we are exploring doing in the next session of legislature, and it has been discussed here at some extent today, is creating a bonding pool that would be financed through a severance tax paid by the mining industry so that these bonds would be available to small miners, not with any additional taxes on the industry, not with any public funds, but through a bonding pool with the tax already paid by the industry.

Senator **McClure**. Mr. McVee.

Mr. **McVee**. In speaking with small miners that have had to put up bonds, particularly those on national forest, it has all been a cash bond. They have not been able to get coverage.

Senator **McClure**. And if they do not have cash, they cannot do it.

Mr. **McVee**. That is right.

Senator **McClure**. Mr. Neff.

Mr. **Neff**. I do not think there is any serious question except on the incremental reclamation projects that have gone on, but where they require reclaiming steps, it may be possible within that limitation of exposure to obtain a bond from someone. However, mining as such is almost impossible to bond. We are finding the big international companies generally will essentially underwrite it because they are self-insuring. It is the way it comes out. If the insurance company cannot operate in that manner with their balance sheet, then there is none available.

Senator **McClure**. Mr. Roybal.

Mr. **Roybal**. We have had that same time of experience under the Surface Mining Act where basically at this point we do not have any small operators left. The only people that can afford the bonds, or get bonding, or for that matter get self-bonding, are the large international companies. I point out that it is probably an even broader problem than the mining industry. For instance, it is difficult to get bonding for underground storage tank program right now. It is a very universal type problem under different situations.

Senator McClure. Thank you. Mr. Chairman, I do not have any other questions at this time.

Senator Bumpers. Senator Burns.

Senator Burns. Thank you, Mr. Chairman. I have a question for Mr. Langley. Of all the minerals that we are mining in the State of Montana right now, what is making the most money? What is most profitable?

Mr. Langley. The mining companies do not give me access to their profit and loss statements, but the precious metals seem to be where the primary interest is in Montana. Of course we are very proud of the fact that we have the only platinum, palladium mine in North America operating in Montana. This country now derives about 10 percent of its platinum and palladium from that mine.

The answer to your question would be the interest is primarily in precious metals at this point.

Senator Burns. We have seen the increased activity in gold mining in Montana and, of course, mining is the only shining star we have up there right now. How much would that market have to fall, or how much economic impact would we have to see in that—we talk about royalties and that seems to be one of your concerns. Of course, we all have to go to the marketplace for our check. In looking at this legislation, and I think you have already addressed the royalties of it, is there any part of this legislation that you can agree with?

Mr. Langley. I cannot agree with the intent of the legislation at all, Senator Burns.

Senator Burns. I am just wondering on that and, of course, every time we talk about legislation here in Washington we do not ever really take into account the social or economic impact on the community that is affected by the legislation. I guess from your testimony it is your view that we would be definitely impacted?

Mr. Langley. I think I would agree with the statement that Senator McClure made earlier this afternoon, and that is if there is a problem, we should find that specific problem and attempt to solve it. As far as any wholesale overhaul of the 1872 Mining Law, we cannot agree to that at all.

Senator Burns. I have no further questions.

Senator Bumpers. Mr. Langley, do you think that people who patent this land ought to use it for mining? I mean the purpose of the 1872 Mining Law was to encourage people to search for minerals. Do you think that intent is a good one?

Mr. Langley. The intent is a good one. I think they should use it for mining. As I indicated in my testimony, we had detected some abuses of that in Montana, and the mining industry itself went to the legislature to try to solve it.

Senator Bumpers. The mining industry itself cannot solve the problem on federal lands. Only the Federal Government can do that.

Mr. Langley. Senator McClure also mentioned earlier—although I do not agree with all of the reversion types of items you have in your particular bill here—but Senator McClure did mention that there could be, if the person is not using it for mining purposes, there could be some mechanism to have that land revert back to the Federal Government. If he is obviously building a summer cabin on it, I do not think he has any right to hold that land under the mining patenting system, and there should be some mechanism to correct that.

Senator BUMPERS. That is—one of the intents of this bill is to stop that sort of thing. So you do not totally disagree with the intent, do you?

Mr. LANGLEY. That is one specific small problem, and it is a very isolated problem. The provisions in this bill are much more extreme, much too extreme and much to radical for us to accept.

Senator BUMPERS. Give me another example of the radicalness of the bill.

Mr. LANGLEY. The royalty system.

Senator BUMPERS. Does Montana have a royalty on state lands?

Mr. LANGLEY. We have what is called a severance tax. It is paid to the state.

Senator BUMPERS. How much is it?

Mr. LANGLEY. There are three different severance taxes. One is called the metal mines license tax, the other is resource indemnity trust tax, and the other is a gross proceeds tax. The effective rate of those three taxes is about five and one-half percent. In addition to that, the state operates a leasing system for any land leased for mineral activity on state lands.

Senator BUMPERS. Montana also plucks a severance tax off of federal lands, does it not?

Mr. LANGLEY. No.

Senator BUMPERS. You do not?

Mr. LANGLEY. Well, for the production on federal lands, yes.

Senator BUMPERS. That is what I am talking about. Hardrock minerals on federal lands, does not Montana collect a severance tax on that?

Mr. LANGLEY. For hardrock production on federal lands, yes, subject to those three severance taxes that I itemized.

Senator BUMPERS. Why do you think it is right for Montana to collect taxes and the United States not to?

Mr. LANGLEY. The United States——

Senator BUMPERS. They are the United States' lands.

Mr. LANGLEY. The United States certainly gets its share out of Montana's mineral production in terms of the $12 million in income taxes, the federal income taxes that people pay.

Senator BUMPERS. Everybody pays income tax.

Mr. LANGLEY. The particular royalty you have is a flat rate. I do not know what you are basing it on. It is excessively high. There is no way that the mining industry in Montana can agree to that. If you want a share of Montana's severance taxes on federal land, on production on federal land, I suggest you write to the Governor and maybe he can make a deal.

Senator BUMPERS. On reclamation, you say that these small operators cannot make a bond.

Mr. LANGLEY. It is very difficult for them to.

Senator BUMPERS. What is your suggestion so far as reclamation is concerned?

Mr. LANGLEY. As I indicated, I think reclamation has to be a very site specific situation taking in the site of the mine, the hydrology of the area, the climate of the area, the topography of the land. I do not think that reclamation can be dictated by the Federal Government.

The legislation that we worked out in the State Legislature earlier this year based the reclamation requirement on what a third party estimated it would be to reclaim the placer mining situation.

Senator BUMPERS. What I am wanting to know is how would you recommend that we address reclamation in this bill? How can we be assured, the Federal Government, that its lands that it patents to somebody for $2.50 an acre, how would you guarantee that that land will be reclaimed when the mining is over?

Mr. LANGLEY. I guess I really——

Senator BUMPERS. You agree that reclamation is a good idea, would you not?

Mr. LANGLEY. Yes, I do agree that reclamation is a good idea. I do not believe that you have seen any patents in Montana that have been accomplished for $2.50 an acre. I think by the time the mineral surveys are taken, by the time all the geological information is gathered, that you are going to find that the cost of patenting that land is closer to $4,000 an acre.

I do believe in reclamation. I think that the reclamation should be kept within the financial limitations, particularly of small miners, and we have attempted to do that in Montana.

I really would not have any objection to some sort of federal bonding pool where you could use abandoned mine reclamation money or something like that, it is a tax already paid by the industry. A bonding pool of some sort could be created at the federal level similar to what we are trying to do in Montana.

Senator BUMPERS. What if the Federal Government charged an excise or royalty and you said half of this will go into a bonding pool for reclamation?

Mr. LANGLEY. You are running into an inequity there. First of all, the royalty that you are talking about is way too high. You will put almost every operating mine in Montana out of business with that.

Second, if you have a bonding pool that is created with an additional tax on the industry, you are penalizing good operators for the poor performance of poor operators.

Senator BUMPERS. Mr. Roybal, does New Mexico have a royalty on hardrock minerals on state lands?

Mr. ROYBAL. Yes, Mr. Chairman, they do.

Senator BUMPERS. Do you generally know how much it is?

Mr. ROYBAL. No, Mr. Chairman, I do not.

Senator BUMPERS. Mr. McVee, how about Alaska?

Mr. MCVEE. Yes. On state lands basically there are two royalties, one is called a production tax and that is up to seven percent. It is a sliding scale, larger operator, larger producer pays a higher rate. That is applied to all mines in the state irrespective of land ownership.

Senator BUMPERS. Does Alaska or New Mexico, either one, require a bond for reclamation on state lands?

Mr. MCVEE. No, not at this point and time.

Senator **Bumpers**. In Alaska they do not. Do they in New Mexico?

Mr. **Roybal**. Mr. Chairman, it is sometimes imposed depending on the operation. It is a selective process.

Senator **Bumpers**. Do you know of any instances, Mr. Neff, where people go out and sell any amount of claims and then turn around and sell the right to explore those claims to somebody else?

Mr. **Neff**. To the extent that a large part of the claims have not passed the test of discovery at the time transactions are entered into, I would have to say yes, because there is a lot of staking activity that goes on at a time when no one knows whether there was a valid claim. That position of having a claim with four corners in a place on the map has market value to those who are coming along next and more serious about the exploring.

Senator **Bumpers**. Nevada, as I understand it, Mr. Smith, Nevada does not have a reclamation law of any kind, does it?

Mr. **Smith**. There is one in the legislature now. I do not think they have voted on it, but it is coming.

Senator **Bumpers**. Mr. Smith, you are a fairly famous man. I read a great story about you in New Yorker Magazine in April.

Mr. **Smith**. I got caught.

Senator **Bumpers**. Here is what it says. It says you have 345 load claims.

Mr. **Smith**. That is right.

Senator **Bumpers**. And under the mining law you must perform $100 of work each year on each claim in order for it to remain valid. That comes to $34,500 a year on your 345 claims, but New Yorker says,

> Don's annual bill is rather steep, or it would be if Don had to pay it. Actually he doesn't pay a penny. His lessees pay him. A mining concern, it might be a large company or it might be a fly-by-night exploration outfit assembled by stock promoters, pay him to explore a package of his claims for a fixed period. The price varies according to the size of the package and how attractively situated the properties are. All of these leases contain a discovery clause which obliges to the lessee to pay Don a royalty, usually between three and five percent on whatever is found.

Is that an accurate statement?

Mr. **Smith**. Yes. Most of those claims are leased out to big companies. That is why I pay nothing. That is part of the lease. Usually the first year you do not get much money as far as advanced royalty. If they keep them the second year and drill and find something, it is more encouraging.

This year, for instance, I had one major company give me two groups of claims back which I have to do the assessment work this summer. So it is kind of an ongoing thing as to how many years one company will keep them.

I have had some claims 20 years and I have never done the assessment work myself on them because they have always been leased out, but they have never been in production. They cannot get enough together to make a mine, but it is enough that they will not quit and give them back.

Senator **Bumpers**. Mr. Smith, do you think it is right for you to take lands from the Federal Government and charge a royalty to your lessees, to anybody that finds anything? Why is it right for you to collect a royalty and not the United States Government?

Mr. Smith. Well, after all, I staked those claims, like I say, 20 years ago. You put about $25 a claim in them at the courthouse recording them, and you go out and it used to be before 1972 you had to dig a hole, like somebody testified here today, so many feet long, so many feet deep on every claim. That saved my bacon one year because somebody jumped me. If it had not been for the old location holes, I could not have proven I ever had any claims there. It is only possessory right. As long as you have backing that shows you were there originally, you may have to go to court, but most of the time you will win if you were the prime locator. So you are not free on any of this.

Some of my claims are 110 miles from town. You start adding up the gas bills, driving out there, blowed out tires, one thing or another. It is not as free as people think.

Senator Bumpers. Mr. Smith, when you find a tract of land that you want to perfect a claim on, how well do you define that land for BLM when you file this claim with them? Do you have it surveyed?

Mr. Smith. I have it surveyed.

Senator Bumpers. You just file a legal description of that claim?

Mr. Smith. That is right.

Senator Bumpers. Is that usually 20 acres per claim?

Mr. Smith. That is right.

Senator Bumpers. There is no limit to how many claims you can file, of course.

Mr. Smith. No, whatever you can afford to do work on.

Senator Bumpers. And in the past you paid $5.00 to file those claims, and in the future you have to pay $10.00, is that correct?

Mr. Smith. That is true. Another little glitch in that law that I did not know until the other day, every time some action takes place on that, for instance, some mining company gives you the claims back and some record goes through BLM, there is $5.00 there. You lease them again, there comes another $5.00, and you file your assessment work, there is another $5.00. So that $5.00 is not really true. It could be three $5.00 fees in one year.

Senator Bumpers. How much of your 345 claims is commercial mining taking place on?

Mr. Smith. I have six turquoise claims that we mine. We have been mining every year since 1971.

Senator Bumpers. You said we. Is that somebody else that leases the land from you?

Mr. Smith. No. Me, my wife and my four kids.

Senator Bumpers. You are doing it yourselves?

Mr. Smith. We do it ourselves, that is right.

Senator Bumpers. I am talking about are there any other miners operating on any of your claims where they pay you royalty?

Mr. Smith. No. Most of the others are microscopic type gold and it takes three to five years to ever define a mine if there is one there. You do not do it very fast. Some companies—I have had three different companies on one set of claims since ten years. A new company may come on and drill over here and find something better than the last guy did over here. So the more companies that look, you stand a better chance of making a mine out of it eventually.

Senator **Bumpers**. Mr. Smith, you are what we would call a legitimate operator and what you are doing is certainly legal. If you can extract three percent or 20 percent, or whatever you can get out of your lessees, that is just jakey with me. Do you agree with one of the intents of this legislation, and that is to stop people from using this land for huge profits for non-mining purposes?

Mr. **Smith**. Yes. In fact, in that article I told them about these what I call fly-by-nighters that come in and tie up your claims. For 40 claims they might give you $2,000 and they go off selling stock on it, and then you would have to take that $2,000 you got to get a lawyer to get your papers back and get rid of them.

My wife says you better start getting $5,000 or $10,000 so you have enough to pay the lawyers to get rid of them. So there is all kinds out there.

Senator **Bumpers**. Mr. Langley, do you agree with that part of the bill?

Mr. **Langley**. As far as to take care of the abuses that occur with people using patented claims for non-mining purposes, yes. I guess I agree with the problem. I am not sure that I agree with some of your proposed solutions.

Senator **Bumpers**. How would you——

Mr. **Langley**. As I mentioned, although I do not agree with all the reversion provisions in your bill, I think that some sort of reversion might be necessary when, upon investigation, upon an examination, it is found that this person is not using the land for mining purposes. That is what we attempted to do in Montana. In Montana taxation was the way we took care of the problem.

If we can identify specific problems that are legitimate, wide spread public policy concerns, I would be more than happy to work with you on them, Senator Bumpers. But I do not agree with the wholesale revision of the very most basic mining law that has ever been passed.

Senator **Bumpers**. I had a philosophy professor one time and he said when his first child was born, his son, and he said the first time his son said "Da Da" he almost fainted. But he said if that kid got to be 25 years old and he was still saying "Da Da," I'd take him to the nearest psychiatrist.

We have a 117 year old law here that is still saying "Da Da" as far as I am concerned.

Mr. **Langley**. I guess we have an honest disagreement on that, Senator, because I do not agree with you.

Senator **Bumpers**. Even the Constitution, which I consider the greatest document ever written, has been changed 26 times. This law has never been changed once.

Mr. **Langley**. The procedures for changing the Constitution are much different than changing a statute.

Senator **Bumpers**. A lot easier I think on this case.

Senator **McClure**. Would the senator yield on that? As a matter of fact, the mining law of this land has changed a lot of times over the years. I do not want to engage in an argument with my Chairman tonight, but there is a perception that some how this 117 year old law is just as it existed in 1872, and that simply is not true. As a matter of fact, there was reference made earlier to the fact of earlier studies that bore out the results of, or came to the same conclusions of the latest GAO study, and I use that term loosely, concluded.

As a matter of fact, a number of those studies were prior to, and reports were completed, prior to subsequent congressional action. We have enacted statutes repeatedly, the 1920 Mineral Leasing Act, the Common Varieties Minerals Act, the FLPMA statute itself, just to pick out a handful. There have been lots and lots of congressional action. With respect to the mining on public lands, Congress has periodically reviewed the application of laws and has affirmed them in part, changed them in part.

Senator **Bumpers**. Gentlemen, thank you all for being with us. I know some of you have come a long distance. We appreciate you coming here. It has been a long day, but it has been an edifying day.

The committee will stand in recess until the call of the Chair.

[Whereupon, at 8:55 p.m. the hearing recessed, subject to the call of the Chair.]

APPENDIXES

Appendix I

Responses to Additional Committee Questions

United States Department of the Interior
TAKE PRIDE IN AMERICA

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

IN REPLY REFER TO
3800(680)

JUL 26 1989

Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral Resources
Committee on Energy and Natural Resources
Development and Production
United States Senate
Washington, D.C. 20510-6150

Dear Mr. Chairman:

This is in response to your June 13, 1989, letter transmitting to us questions relating to the June 7, 1989, hearing on the Mining Law of 1872 and S. 1126, the "Mining Law of 1989."

Our answers to the questions from you and from Senator Bumpers are enclosed. If you should require additional information, please let us know.

Sincerely,

Cy Jamison

Director

Enclosures

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

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Sincerely,

S/

Director

Enclosures

Senator Bingaman
Questions for Director Burford
Hearing on the Mining Law
June 7, 1989

#1. What do you see as the Mining Law's greatest strength and its greatest weakness?

Answer: The greatest strength of the Mining Law is its ability to unlock the entrepreneurial spirit of the mining industry and to permit that spirit to flourish with relatively little governmental involvement or interference. Because of this law, the government does not have to assess the hardrock mineral content of all of Federal lands, industry will do that.

Industry is free to seek its own best solution to the changes of the marketplace. Successful development of mineral resources has been rewarded with a profit and the opportunity to own the mineral deposit. The government is not required to determine how any or all parties may gain access to Federal lands for the purposes of developing mineral resources. The government is not required to bear any of the risks associated with the economic success or failure for any or all mineral ventures. Development of locatable minerals under the Mining Law has flourished for 117 years and has provided the public with a largely uninterrupted supply of the mineral commodities necessary for daily life without the need for a large government bureaucracy and equivalently large budget.

The greatest weakness of the Mining Law comes as a result of its strengths being relatively unknown to the general public. Hence, it is relatively easy for the Mining Law's opponents to create a false image of the law and its effectiveness. In other words, the very valuable rewards of profit and ownership for the few successful mining claimants, the lack of visibility of the majority of mining claimants who fail to succeed, the large percentage of the population unfamiliar with law, and the lack of widespread public concern for the issue of mineral commodity availability, all work to the advantage of a relatively small group of opponents of mineral exploration and development. These opponents are able to publicly create unchallenged, erroneous portraits of the law and the industry's use of the law, in a public that lacks the understanding of the role the uninterrupted delivery of mineral commodities plays in the public's daily lives and the Mining Law's role in preserving that continued flow.

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#2. The Bureau of Mines estimates that 3.6 million troy ounces of gold, valued at over $1.5 billion, was produced in Nevada in 1988.

o - What percentage of this was produced on federal lands?

o - I understand that the Forest Service keeps production and value of production figures for hardrock mining on national forest lands. Please provide these figures for BLM lands.

Answer: The State of Nevada is 85% owned by the United States. The majority of the 3.6 million ounces of gold estimated by the Bureau of Mines was produced from Federal land. The Forest Service has advised us that their estimate is extrapolated from the few operations they administer where the grade, tonnage, and production rates are volunteered by the owner.

The Bureau of Land Management's estimate is:

State	Estimated Value ($ Million)
AK	$ 530
AR	$ 0.2
AZ	$ 145
CA	$1,293
CO	$ 36
ID	$ 38
MT	$ 174
NV	$1,376
NM	$ 293
OR	$ 40
UT	$ 37
WY	$ 1
Total Federal	$3,963
Less USFS	(694)
Total BLM	$3,269

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#3. To what extent does BLM have discretion to prohibit mining in environmentally sensitive areas?

Answer:
The Bureau, rather than prohibiting mining chooses to closely regulate exploration and mining operations in environmentally sensitive areas. The BLM utilizes its existing authority and that found in the existing State and Federal substantive environmental laws to accomplish this task.

The 43 CFR 3802 rules regulate operations on lands under wilderness review. Operations on post-FLPMA mining claims must meet the non-impairment standard of section 603c of FLPMA, in addition to the prevention of unnecessary or undue degradation standard found in section 302b of FLPMA. Pre-FLPMA mining claims that are exercising valid existing rights must meet the prevention of unnecessary or undue degradation standard. The surface management regulations at 43 CFR 3809 regulate all operations on Federal lands not under wilderness study and require an operator to prevent unnecessary or undue degradation.

Operations are reviewed to determine if they will prevent unnecessary or undue degradation, and in the case of wilderness study areas prevent impairment. In the case of certain environmentally sensitive lands, such as designated wilderness, wilderness study areas, wild and scenic rivers, and areas of critical environmental concern, detailed review and approval of plans is required before an operation may begin.

When reviewing the plan, the authorized officer may approve the plan as submitted or modify the plan to ensure prevention of unnecessary or undue degradation through the alteration of the plan or the development of mitigating measures. Full consideration of all involved resources, including endangered species, cultural resources, wilderness characteristics and wildlife habitat, is a part of the review process. The Bureau must complete full compliance with Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act before an operation is approved. In addition the operator' plan must comply with the substantive State and Federal environmental laws.

While completion of various aspects of the review process may delay the approval of an operation, due to the time needed to complete procedures, only a unresolvable conflict with a species will actually result in the absolute denial of the approval of a 3809 plan. The plan approval will be conditioned on the operator's acceptance of the mitigating measures, the alteration of some or

Senator Bingaman
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all of the proposed operations, or the posting of an appropriate bond prior to initiating operations.

In a few instances, the conditions developed by the authorized officer have been appealed by the operator. In even fewer instances the operator has determined that the property is no longer economic and abandoned the property. This rarely happens because most of the industry operators and the Bureau have developed a high degree of mutual respect and sought to be cooperative.

In addition to satisfying the protections thought to be necessary by the BLM, an operator must meet the protections required by the vast array of substantive State and Federal environmental laws. One operator in northern California reported that a total of 324 permits were required before activities could commence. The protections afforded by this regulatory environment obviate the need to prohibit mining in environmentaly sensitive areas and serve to amply protect the resources that are the subject of the Bureau's jurisdiction.

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#4. To what extent are strategic minerals currently mined on federal land? Why is there not more production of these minerals from lands currently open to location under the Mining Law?

Answer: Several strategic commodities are mined from Federal lands. These are Rare Earth Elements (REE) from Mt Pass, California; platinum and palladium from the Stillwater Mine, Beartooth Range, Montana; beryllium from Utah; lithium from Nevada; Mercury from Utah and Nevada; and tungsten from California. However, the remainder of the public land currently open to location under the Mining Law is not known to contain ground that is geologically favorable for hosting these types of mineral deposits. In Alaska, Montana, and California there are favorable areas from the geologic perspective, but they are withdrawn from entry under the Mining Law, either by legislation or by Departmental Public Land Order.

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#6. **To what extent does the "small miner" contribute to the development of commercial deposits?**

Answer: In the current North American mineral industry structure there is little in the way of grassroots exploration on the part of the larger companies, often referred to as "Majors", whose focus is more on production than exploration. Exploration has, for the most part, been left to the small company and the individual operator, usually referred to as "Juniors" or as "small miners." Junior operators spend considerable time and effort to develop properties for submittal to the Majors for consideration.

Precious and base metal mining has become increasingly concentrated in a fewer number of capital- rich companies that have ready access to the Asian and European capital markets. In contrast to the mining company "Majors", the exploration company "Juniors" or "small miners", tend to be capital- poor with limited cash reserves and limited access to capital markets of North America, Asia or Europe.

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#5. Is there a security of tenure problem prior to a discovery of a valid mineral deposit under the Mining Law of 1872? If so, how could this be resolved?

Answer: No, because the Federal Courts have recognized that the judicial doctrine of "pedis possessio" applies to a mining claimant. This means that a mining claimant who is actively and diligently working his mining claim to develop its mineral(s) is protected from adverse locations and challenges from rival mining claimants. This protection ceases if the mining claimant does not actively work and develop his mining claim.

Senator Bingaman
Questions for Director Burford
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June 7, 1989

#7. How long does it take between receipt of an application for patent and the issuance of a patent?

> **o - What percentage of mining operations are currently conducted on unpatented mining claims?**

Answer: If the application is totally under Bureau control, the average time frame is 24 months. If another surface management agency is involved in the field examination additional time is required. Variance in the amount of time required is considerable due to the complexities of the information required and the cooperation of the various agencies. The range of time required to issue a patent could vary from 1 year to 5 years. We have no data on the number of operations currently on patented mining claims, because they are private property and outside the purview of the Interior Department. All operations under our jurisdiction are therefore on unpatented mining claims.

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#8. To what degree are non-mining activities conducted on mining claims? What, in your opinion, can be done to improve this situation?

Answer: Almost all activities conducted on a mining claim are mining or mining related. However, as with any law there are those who will abuse or purposefully misinterpret the law. There are a number of occupancy trespasses occurring on mining claims on public land.

With the advent of **Bruce W. Crawford, et ux** 86 IBLA 350, (1985) decision and the publication last year of BLM Manual Section 3893-**Residential Occupancy On Mining Claims**, the BLM is actively working to resolve mining claim occupancy trespass. There are several cases in several States which involve mining claim occupancy trespass that are currently in litigation. The 43 CFR 2920 realty trespass regulations issued last year augment the ability of the BLM to deal with occupancy trespass both on and off mining claims.

The situation will improve as the cases now in litigation are decided and a body of administrative case law is developed. When it becomes known that mining claim occupancy trespass is being actively pursued and there is a history of litigation which resulted in trespassers being removed, fewer people will seek to occupy public land under the guise of the Mining Law.

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#9. Please provide a list of the amendments to the Mining Law since 1872.

Answer: Building Stone Placer Act; Act of August 4, 1892; 27 Stat 348 (Building stone make subject to location).
Petroleum Placer Act; Act of February 11, 1897; 29 Stat 526. (This allowed oil and gas deposits to be located as a placer claim).

Saline Placer Act; Act of January 31, 1901; 31 Stat 745. (salts of sodium, potash, potassium made subject to location).

Coal Lands Reservation; Act of March 3, 1909; 35 Stat 844.

Potash, phosphate, nitrate, oil and asphalt are reserved in mineral patents; Act of July 17, 1914; 38 Stat 509.

Mineral Lands Leasing Act; Act of February 25, 1920; 41 Stat 437. (Removes oil, gas, sodium, phosphate, potash, oil shale, etc from the Mining Law and makes them subject to leasing).

Material Sales Act; Act of July 31, 1947; 61 Stat 681.
(allows sales of common varieties of minerals, sand, gravel, pumice, cinders, etc).

Multiple Mineral Development Act; Act of August 13, 1954; 68 Stat 708. (leasing act minerals are reserved in mineral patents).

Surface Resources Act; Act of July 23, 1955; 69 Stat 367;(removes common variety minerals from the Mining Law and makes them salable, sand, gravel, cinders, pumice, etc).

Mining Claim Rights Restoration Act; Act of August 11, 1955; 69 Stat 681. (Opens powersite withdrawals to entry under the Mining Law, subject to certain reservations to the US).

Act of March 18, 1960; 74 Stat 7. (This extends the millsite provisions of the Mining Law to placer claims).

Act of September 26, 1962. (Petrified wood removed from location under the Mining Law).

Mining Claim Occupancy Act; Act of October 23, 1962; 76 Stat 1127. (Allowed patent to issue to residential occupants of mining claims under certain limited conditions).

Geothermal Steam Act; Act of December 24, 1970; 84 Stat 1566. (This removed "steam" and hot springs from prospective location and made geothermal waters and products leasable).

Mining in the Parks Act; Act of September 28, 1976; 90 Stat 1342. (This withdrew all National Parks and Monuments from the Mining Law).

Federal Land Policy and Management Act (FLPMA); Act of October 21, 1976; 90 Stat 2743. (Section 314 established a Federal level mining claim recordation system. Section 302[b] established a surface management responsibility for all surface disturbing actions. Section 601 established the California Desert Conservation Area [CDCA]. All mineral patents issued are subject to the CDCA land use plan).

Senator Bumpers
Questions for the Interior Department
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June 7, 1989

#1. Please supply the Bureau of Land Management's (BLM) annual budget and FTE's for administering the Mining Law program for each of the past 10 years, including the costs of surface management activities pursuant to FLPMA. Please break down the costs by activity.

Answer: (all units are $000)

State/Yr	1982	1983	1984	1985	1986	1987	1988	1989
SM	543	567	970	1430	2096	2555	2836	3079
MCR	1066	828	938	1265	1421	1534	1550	1683
MPA	1250	1100	1200	801	826	873	870	944
OVH	1152	1082	1300	1406	1462	1507	1809	1964
OTH	1761	1833	2091	2126	1507	1067	1980	2150
D$	5763	5410	6499	7028	7312	7536	9045	9820
LA	445	1149	803	892	944	1474	1192	1400
APP	6208	6559	7302	7920	8256	9010	10237	11220
FTE	239	254	222	220	218	238	251	270

NB: SM= Surface Mgt; MCR= Mining Claim Recordation; MPA= Mineral Patent Appl'n; OVH= Overhead; OTH= Other (land & realty support, valid existing rights, trespass, EISs and related misc actions); D$= Direct dollars available (Appropriation minus leave account); LA= Leave account; APP= Appropriation; FTE= Full time equivalent positions as coded on BLM timesheets. Data prior to FY 1982 is not available. FY 89 estimated. Fees collected pursuant to PL 100-446 and 43 CFR 3833 are estimated to net the Bureau a total of $764,000 in FY 1989, after repaying the Treasury $742,000 as required by PL 100-446.

Senator Bumpers
Questions for the Interior Department
Hearing on The Mining Law
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#2. How many active mining operations are there currently on federal lands.

Answer: Under the 1872 Mining Law, the BLM has 748 and USFS 1,209 producing mines. Exploration and development activities are not included in this figure.

Senator Bumpers
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#3. How many notices of intent or plans of operations have been filed with BLM per year for the last 10 years?

Answer: Secs. 302(b) and 603(c) of the Federal Land Policy and Management Act require the Secretary to prevent unnecessary or undue degradation of the public lands and to not impair wilderness values in wilderness study areas. The regulations to implement these sections of FLPMA, 43 CFR 3802 and 3809, became effective in fiscal year 1981. Listed below are the numbers of notices and plans filed with BLM from 1981-1988:

Year	Notices	Plans
1981	1706	462
1982	1708	559
1983	1435	429
1984	1823	523
1985	2107	398
1986	1966	426
1987	1860	456
1988	2034	469

Senator Bumpers
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#4. **What is the cost of processing or administering the notices of intent or plans of operations?**

Answer: In FY 1988, the Bureau spent $1,902,803 on notices and plans of operations; and $933,404 on compliance actions for surface management.

Senator Bumpers
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June 7, 1989

#5. How many plans of operation have been denied in the past 10 years?

Answer: During the last 10 years 3,722 plans of operation have been received by the Bureau under the surface management regulations.

The 43 CFR 3802 rules regulate operations on lands under wilderness review. Operations on post-FLPMA mining claims must meet the non-impairment standard of section 603c of FLPMA, in addition to the prevention of unnecessary or undue degradation standard found in section 302b of FLPMA. Operations on pre-FLPMA mining claims that are exercising valid existing rights must meet the prevention of unnecessary or undue degradation standard. In the last 10 years approximately sixty 3802 plans have been rejected. In the past 10 years no 3809 plans have been denied.

Operations are reviewed to determine if they will prevent unnecessary or undue degradation, and in the case of wilderness study areas prevent impairment. In the case of certain environmentally sensitive lands, such as designated wilderness, wilderness study areas, wild and scenic rivers, and areas of critical environmental concern, detailed review and approval of plans is required before an operation may begin.

When reviewing the plan, the authorized officer may approve the plan as submitted or modify the plan to ensure prevention of unnecessary or undue degradation through the alteration of the plan or the development of mitigating measures. While completion of various aspects of the review process may delay the approval of an operation, due to the time needed to complete both procedures, only a unresolvable conflict with a species will actually result in the absolute denial of the approval of a 3809 plan. The plan approval will be conditioned on the operator's acceptance of the mitigating measures, the alteration of some or all of the proposed operations, or the posting of an appropriate bond prior to initiating operations.

In a few instances, the conditions developed by the authorized officer have been appealed by the operator. In even fewer instances the operator has determined that the property is no longer economic and abandoned the property. This rarely happens as most of the industry operators and the Bureau have developed a high degree of mutual respect and sought to be cooperative. Further, the vast array of substantive State and Federal environmental laws which the operator must comply with will often modify a proposed operation is such a fashion as to render it uneconomic, or at least harmless to the resources that are the subject of the Bureau's jurisdiction.

Full consideration of all involved resources, including endangered species, cultural resources, wilderness characteristics and wildlife habitat, is a part of the review process. The Bureau must complete full compliance with Section 7 of the Endangered Species Act and Section 106 of the National Historic Preservation Act before an operation is approved. In addition the operator must comply with the above noted substantive State and Federal environmental laws.

Senator Bumpers
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Hearing on The Mining Law
June 7, 1989

#6. Please supply the number of on-site inspections of mining claims that have been conducted each year for the past three years. Detail the type of inspection conducted, the type of mining operation, and any actions taken as a result of such inspection.

Answer: During the last three fiscal years the BLM has conducted respectively 2,644, 3,875, and 5,193 inspections of operations. These figures do not include inspections carried out by State agency personnel acting either on their own authority or as partners in a joint State/BLM cooperative agreement. Generally the intended purpose of such inspections is to determine if unnecessary or undue degradation is occurring as a result of an operation. For a small scale operation, less than five acres, the inspections involve checking to ensure the operation is where it is supposed to be (eg. in the location described in the notice), that the operation is as described and that reasonable reclamation is being performed. The larger scale operations are inspected for the same purpose except that there will be a detailed plan of operations and the inspection would ensure that the operations are in accordance with the approved plan.

When a violation of the surface management rules is noted, an attempt to resolve the matter in the field should be attempted. Failing an agreement in the field the authorized officer will attempt to resolve the matter. Failing in such an attempt, the authorized officer may choose to issue a notice of noncompliance, which the operator may choose to appeal. The notice of non-compliance will state the nature of the violation, what must be done to correct the violation, and a timeframe for the actions to correct the situation. The operators actions to comply with the provisions of the notice of noncompliance are monitored. Operators who perform the necessary actions in a timely fashion are released from the provisions of the notice.

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June 7, 1989

#7. How will the fees collected from the Mining Law program [be] disposed?

Answer: The Mining Law Administration fee monies will generally be distributed to our field offices in proportion to the fee revenues collected by that State.

Senator Bumpers
Questions for the Interior Department
Hearing on The Mining Law
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#8. How many bonds are posted for mining operations on BLM lands? What percentage of total mining operations is this? What are the amounts of the bonds?

Answer: A recent BLM task force identified a total of 748 mining operations extracting base and precious metals and non-metallic or industrial minerals on or partially on lands administered by BLM. A preliminary review of these operations estimates 165 or 22% are bonded either by the States or the BLM. Approximately 95% of these bonds are held by the States. This data does not include exploration or development activities. The bureau must set bond amounts equal to that required to cover the costs of reasonable reclamation, which will vary by operation, site, and mineral commodity. The amount of the bond varies by operation, depending on the size of the area disturbed, the estimated cost of reclamation, and other related factors.

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#9. **Is there currently flexibility in the types of security or bonding required? What alternatives to bonding are available?**

Answer: The BLM surface management rules allow for three classes of financial instruments to satisfy bonding requirements: cash in the complete amount of the bond deposited in a Federal Depository of United States Treasury, negotiable securities of the United States having a market value of not less than the required bond amount, or a surety bond provided by a surety approved by the United States Treasury.

In the realm of providing financial guarantees few low cost alternatives to surety bonds exist, however the availability of surety bonds is now in question. The experience of the Office of Surface Mining, Reclamation and Enforcement and the GAO is particularly instructive in this subject. In their view a surety bond crisis now exists for small and medium coal operators, which has forced them to seek other more costly alternatives. This has led in its turn to a liquidity crisis for those operators who need the capital for mining operations.

Bonding is simply one of many tools that should be available to the regulator of any industrial use of the land. As we have stated before, mandatory bonding could have extremely harmful effects on exploration and start-up mining operators who comprise the majority (and the future) of the North American mineral industry. The current state of the bonding problem in the coal industry is further justification for providing the land manager with a complete toolkit to assist in managing the lands.

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#10. How many operators have lost bonds due to failure to comply with a plan of operation or for the failure to reclaim? Are such operators treated any differently in terms of bonding or approval of plans of operations in the future?

Answer: We have polled the field offices to make an estimate of the numbers of operators who have lost bonds due to failure to reclaim or failure to follow a plan of operations. We have estimated, based on this review, that no more than ten operators have had their bonds attached by either the State or BLM.

Operators who have lost a bond are generally those who have established a record of noncompliance. These operators will be allowed to conduct future operations only after they post a proper bond and obtain an approved plan of operations for any activity in excess of casual use.

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#11. **Several General Accounting Office reports have detailed problems with reclamation under the Mining Law of 1872. How many abandoned sites has BLM reclaimed? At what cost? What is the extent of unreclaimed mining operations currently? What is the cost of cleaning up those that present health and safety hazards, or environmental threats?**

Answer: We do not agree with the GAO findings with respect to "problems" with reclamation. Our analysis of the GAO data shows it to be a projection based on only 30 limited operations.

A significant aspect of almost all of the 30 sites noted by GAO is their proximity to areas of historic exploration and mining interest and in a number of the cases, their subsequent reactivation. We would expect that any unreclaimed sites in other States would likewise show some degree of reactivation. We also note that sites in those States with a strong mining and reclamation program would have already received regular scrutiny from the State and local authorities.

The extent of unreclaimed operations estimated by the GAO is flawed for the reasons outlined in the answer to Question Number 37. The Bureau established a Task Force, that among other things, examined the extent of unreclaimed disturbance and arrived at a considerably lower figure of 2900 acres out of all the acreage disturbed by operation authorized under the surface management rules.

A estimate of costs to reclaim sites was developed by GAO, based in part on data supplied by BLM (attachment 1). With respect to the estimate of costs, we note that the costs borne by various Federal and non-Federal agencies are overwhelmingly based on Abandoned Mine Lands (AML) and Superfund examples. First, neither category provides a useful estimate of reclamation costs that would be borne by an agency or an operator who may choose to reclaim preexisting disturbance as a part of the normal course of operations. These two categories of costs would necessarily include the administrative and overhead costs of the involved agencies plus the costs of a contractor to mobilize and demobilize equipment, meet payrolls and achieve a proper profit. All of these items would tend to inflate costs.

United States General Accounting Office

GAO

Briefing Report to the Chairman,
Subcommittee on Mining and Natural
Resources, Committee on Interior and
Insular Affairs, House of Representatives

April 1988

FEDERAL LAND MANAGEMENT

An Assessment of Hardrock Mining Damage

SECTION 2

STATE AND FEDERAL FUNDS SPENT TO RECLAIM HARDROCK MINE SITES ON FEDERAL LANDS

State and federal agencies have spent over $3.2 million to reclaim federal land disturbed by hardrock mining in 10 of the 11 western states in our review. The states spent most of these funds--about $2.9 million--while federal agencies spent about $364,000.

STATE FUNDS EXPENDED

Since 1974, 5 of the 11 western states in our review (Colorado, Montana, New Mexico, Utah, and Wyoming) have spent about $2.9 million to reclaim federal land damaged by hardrock mining, according to state officials. Officials in the remaining six states (Arizona, California, Idaho, Nevada, Oregon, and Washington) said no state funds have been spent to reclaim hardrock mine sites on federal land. Most of the money spent (about $2 million) came from the abandoned mine land reclamation fund (AML) established under title IV of the Surface Mining Control and Reclamation Act of 1977, as amended. Although the primary purpose of the AML fund is to promote the reclamation of areas adversely affected by coal mining operations, in some instances funds may be used to reclaim non-coal sites that endanger human life and property, constitute a hazard to public health or safety, or degrade the environment. For example, in 1985 and 1986, Utah spent about $18,000 of abandoned mine land reclamation funds to close 22 mine shafts on BLM land. In addition to AML money, Montana, Utah, and Wyoming have spent a total of about $849,000 to reclaim hardrock mine sites on federal lands. These funds came from fines and fees the states impose on mine operators for reclamation purposes. Montana made the greatest expenditures from this source, spending about $620,000. (See table 2.1.)

Table 2.1: State Expenditures To Reclaim Hardrock Mine Sites On Federal Land

State	Land managing agency	Year of reclamation	Source of funds		State total
			AML	State	
Colorado	BLM	1986	$ 54,000		
	Forest Service	1985-87	55,000		
	National Park Service	1987	7,000		
	Bureau of Standards	1986	4,000		$ 120,000
Montana	BLM/Forest Service	1983-87	549,430[a]		
	Forest Service	1987		$ 620,265[b]	1,169,695
New Mexico	Forest Service	1987	233,640		233,640
Utah	BLM	1985-87	20,667		
	Forest Service	1982-83		13,389	34,056
Wyoming	BLM	1974-87		215,078[a]	
	BLM	1985-87	1,017,667		
	Forest Service	1985-87	102,944		1,335,689
Total			$2,044,348	$848,732	$2,893,080

[a] State officials' estimates.

[b] Includes projects on or adjacent to Forest Service land.

FEDERAL FUNDS EXPENDED

BLM and the Forest Service have spent about $363,523 since 1978 to reclaim abandoned hardrock mine sites on federal land. In general, this money has come from funds appropriated by the Congress for use in managing various programs, including the mining law program. Officials of both agencies use appropriated program funds to reclaim land only if unreclaimed land (1) presents a danger to public health or safety or (2) causes the degradation of environmentally sensitive areas such as wilderness study areas. For example, BLM officials in Idaho told us that the BLM state office spent $130,000 in 1983 and 1984 to reclaim an abandoned lead milling site after 50 cattle died from eating toxic chemicals that had seeped to the surface at the mine site. (See table 2.2.)

Table 2.2: BLM and Forest Service Expenditures to Reclaim Hardrock Mine Sites on Federal Land in the 11 Western States We Reviewed

Agency	State	Approximate acreage	Number of mine sites	Year expenditure occurred	Expenditures BLM/Forest Service
BLM	Arizona	3	3	1986	$ 5,410
Forest Service	Arizona	185[a]	6	1978-83	72,200
BLM	California	b	1	1986	13,037
Forest Service	California	160	1	c	25,000
BLM	Idaho	5	1	1983-84	130,000
BLM	Nevada	3	1	1986	3,976
BLM	Oregon	40	1	1984-85	1,400
BLM	Wyoming	d	6	1985-87	112,500
Total					$363,523

Note: BLM and Forest Service officials reported no expenditures to reclaim land for five states in our sample (Colorado, Montana, New Mexico, Utah, and Washington).

[a] The Forest Service reclaimed an additional 2.5 acres of hardrock mine sites in 1979 and 1980 for which the reclamation cost is not known.

[b] No acreage was reclaimed, but drums containing cyanide were removed.

[c] Estimated by a Forest Service official to have occurred within the past 10 years.

[d] BLM spent $85,000 to plug 35,000 drill holes on approximately 122 square miles of BLM land.

Category	Estimate	Error (+/-)	Page
Cost to reclaim land disturbed before regulations went into effect	$195,661,875	$ 97,005,754	9
Cost to reclaim land disturbed after regulations went into effect	$ 49,260,618	$ 26,871,679	9
Cost to reclaim land for which it is uncertain when disturbance occurred	$ 38,640,702	$ 16,708,259	9
Cost for ongoing reclamation or reclamation not needed at the time of our review	$ 17,322,928	$ 11,390,614	9
Acres on lode mining claims	243,888	92,547	10
Acres on placer mining claims	74,748	55,451	10
Acres on millsite mining claims[a]	44,401		10
Acres on unknown or unidentified types of claims	61,012	29,172	10

[a] Because the sampling error exceeds the projected number of acres for millsite mining claims, the projection is considered unreliable.

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#12. **What is the rationale for exempting operations of less then 5 acres from the filing and approval of plans of operation? To what extent have these sites violated federal or state laws, or been abandoned without the site being reclaimed?**

Answer: The 5-acre threshold came into existence as the result of the four year controversy that began with the first attempt to promulgate regulations to implement the mandates of sections 302(b) and 603(c) of the Federal Land Policy and Management Act in December 1976. The original proposal for the regulations provided for the filing of a notice to enable the authorized officer to determine if the threshold for a plan of operations was going to be crossed by a proposed activity. The concept of the proposal was similar to the concept in the existing Forest Service rules.

The plan-level threshold involved a determination regarding "significant" surface disturbance, construction or improvement of means of access, or construction of structures on public lands. "Casual use" as such was not recognized; however, operations such as hobby collecting of rocks and minerals, prospecting or sampling resulting in no significant surface resource disturbance and the removal of reasonable amounts of the mineral deposit, and underground operations with no significant surface resource disturbance were specifically excluded from plan requirements.

The negative public response to the proposal required a reexamination and revision of the proposed regulations. Much of the criticism of the original proposal focused on the wide latitude given to the authorized officer by the definition of significant disturbance. In 1980, the reproposed regulations attempted to adopt a system that did not depend on judgment as to the "significance" of disturbance. In that proposal, casual use was again not recognized; however, certain operations were specifically excluded from the plan requirements. The notice concept was abandoned and the threshold for a plan was rigorously defined to include: construction of access, destruction of trees greater than 2 inches in diameter, use of tracked vehicles, off road vehicle usage for any lands other than an open area, construction of structures on public lands, use of explosives, and diversion of a watercourse.

Critical public comments on the reproposed regulations resulted in a hearing by the House Subcommittee on Mines and Mining on April 24, 1980. At the conclusion of the hearing, Chairman Santini sent a letter on May 12, 1980, to BLM Director Gregg. That letter, among other things, stated that the hearings provided evidence that BLM's own projections showed insufficient staff to implement the regulations, that a substantial revision of the proposed rule was

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in order, and that the resulting rules should be similar to the Forest Service rules (eg. reintroduce the notice/plan concept). Director Gregg responded to the Chairman in a June 10, 1980, letter advising him that the revised regulations would separate the wilderness study regulations (3802) from the final 3809 regulations, that the regulations were being "looked at" by the staff, and every effort would be made to accommodate the small miner.

During time between the hearings and the publication of the final regulations, discussions centered on ways to reduce the administrative burden on the affected public and BLM. The provisions for a notice were readopted and the concept of casual use was introduced. The intent was to create a system that would allow for the identification of significant operations, without being unnecessarily burdensome. The staff analysis of the options for a threshold between notice and plan concluded that most exploration drilling operations conducted by a reasonably prudent operator would result in disturbance of less than 4.2 acres, thus the 5 acre threshold was selected.

A task force established in 1986 examined the question of noncompliance as a part of an effort to examine the BLM bonding policy. The task force completed its work in April 1987, and a copy of that work was transmitted to the Senate Government Operations and Oversight Committees.

The Task Force found that approximately 90% of the 14100 notices and plans were in compliance with the surface management regulations, which includes the substantive federal and state environmental laws. Approximately 1410 operations had been in noncompliance. The typical instances of noncompliance included failure to perform reasonable reclamation, failure to file the appropriate documents (eg. notice or plan of operations), or failure to conform to a notice or an approved plan. Failure to comply with the substantive federal and state environmental laws was not identified as a problem.

The task force found that 58% of the operations in noncompliance had been resolved, 34% were being pursued by the BLM and only 8% of the 1410 operations in noncompliance could not be resolved due to the inability to locate the operator. Judicial relief was found to be necessary for only 4% of all 1410 instances of noncompliance.

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#13. The Forest Service estimates that the value of annual hardrock mineral production on national forest lands is $694 million. Please provide such an estimate for BLM lands.

Answer: The Bureau of Land Management's estimate is:

State	Estimated Value ($ Million)
AK	$ 530
AR	$ 0.2
AZ	$ 145
CA	$1,293
CO	$ 36
ID	$ 38
MT	$ 174
NV	$1,376
NM	$ 293
OR	$ 40
UT	$ 37
WY	$ 1
Total Federal	$3,963
Less USFS	(694)
Total BLM	$3,269

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#14. The Bureau of Mines currently collects various data on the mining industry. Does the Bureau of Mines have adequate authority to request information from the mining industry on the value of minerals taken from unpatented claims on public land? Consider this a formal request from Senator Bumpers to collect that information on a regular basis beginning as soon as possible. If additional authority is needed, please provide draft legislative language.

Answer:The Bureau of Mines has adequate authority to request information from the mining industry on the value of minerals taken from unpatented claims on public lands, but does not currently collect or tabulate such data. The most recent authority for the Bureau of Mines information activity is the National Materials and Minerals Policy, Research and Development Act of 1980 (Public Law 96-479, 96th Congress). Section 5(f) of this law also strengthened protection for proprietary data provided to the U.S. Department of the Interior by persons or firms engaged in any phase of mineral or mineral-material production or consumption. However, such information may be disclosed if there is no objection by the donor, and "the Secretary may disclose nonaggregated data and information to Federal defense agencies, or to the Congress upon official request for appropriate purposes."

Although the Bureau of Mines has the authority to collect mineral data, the Bureau has determined that the most efficient approach to data collection is a voluntary one. Nevertheless, response rates have declined over the years as respondents are required to comply with additional statistical and regulatory surveys from other Federal and State agencies. Furthermore, the Bureau may not be able to publish some of this information because of proprietary reasons. Additional questions on the survey forms could increase nonresponse rates, resulting in the use of estimation or imputation techniques to account for the missing data, further impeding the efficient collection of current data.

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#15. **Please provide a step-by-step explanation of BLM interaction with mining operations from prospecting through reclamation and bond release.**

Answer: The BLM becomes involved in a mining operation from its inception to its final reclamation should the operation remain unpatented. We assume a mining operation will occur on a mining claim which has five elements in its lifecycle: Discovery, Location, Recordation, Maintenance and Patenting. The BLM is involved in three of the 5 elements through the Mining Law and FLRMA. These elements are Recordation, Maintenance, and Patenting. Of these three, the on-the-ground actions are found in the Maintenance element, which includes actual exploration and mining operations and any other actions that may be classed as assessment work.

Management of the on the ground involves an increasing degree of BLM involvement in operations as operations progress from casual use level to notice level to plan of operations level. At casual use level there is little need to become involved in operations as these activities generally resemble the activities of the average hunter or recreationist.

At the notice level, actions generally associated with exploration and small scale mining occur. The notice provision of the 3809 rules provides BLM with a system to identify those operations with the potential to generate resource conflicts and to work with the operator to avoid or mitigate the conflicts. The five acre threshold ensures that such operations will be limited geographically.

At the plan level the involvement of the BLM is more detailed, involving review and approval of necessary and due operations and the denial of those aspects of any proposal that are neither. Full consideration of all resources is undertaken in the course of the review. BLM will approve any plan that prevents unnecessary or undue degradation and provide for reasonable reclamation, or modify any proposal that fails to provide for either. Bonding, if determined to be appropriate will be set in an amount sufficient to reclaim the necessary disturbance.

BLM will periodically inspect the operations to see if the provisions of the plan are being followed, reasonable reclamation is being performed and the approved plan still applies to the actual on the ground situation. Plans that are no longer adequate will be modified. At the close of operations, a final inspection will take place to determine if reclamation has been completed.

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Bonds which remain will be released at that time and the case file will be closed.

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#16. **Please provide the number of environmental impact statements and environmental assessments done on plans of operation for the past years.**

Answer: In the last 10 years, the BLM has reviewed 3722 plans of operations pursuant to 43 CFR 3802 and 3809. These reviews have necessitated the preparation of 3722 Environmental Assessments. A total of fourteen Environmental Impact Statements have been prepared when the environmental analysis determined that the proposed action was a major federal action or the authorized officer determined prior to preparing an EA that an EIS was necessary.

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#17. Please provide examples of how mining operations on sensitive areas are dealt with absent withdrawal from mineral entry, for example: endangered and threaten species habitat, archeological areas, riparian zones, areas of critical environmental concern, etc.

Answer: All notice and plan level operations are reviewed by BLM staff to determine if known conflicts with cultural resources or endangered species habitat will result from a proposed operation. When such conflicts are known to BLM, Notice level operators are advised not to proceed or to modify their proposals lest the criminal sanctions allowed by FLPMA, Endangered Species Act, or Archeological Resources Protection Act be utilized.

Plan level operations will be modified to eliminate conflicts with endangered species habitat and where this is not possible the plan will be denied. Where the conflicts with cultural resources are identified and cannot be avoided or mitigated, the provisions of 36 CFR 800 (Archeological Resource Protection) will be followed before the operation will be allowed to proceed.

In the case of Areas of Critical Environmental Concern that remain open to mineral entry, the surface management rules require that all operations above casual use levels to be conducted under an approved plan which will permit the authorized officer to develop mitigating measures to reduce resource conflicts to a minimum. Riparian values, such as wetlands, active streams, etc., may in some instances be subject to inclusion in an ACEC through the BLM planning system. Other substantive environmental laws including section 404 of the Clean Water Act must be complied with by the operator, including the need to obtain permits from the appropriate state or federal authorities.

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#18. **Please provide the number of resource management plans required by law, and the status of such for BLM lands.**

Answer: Except for 13 specific areas for which BLM is required by law to prepare resource management plans (RMP's), there is not a specific number of RMP's requirement in the law. However, the law requires that the Secretary of the Interior develop land use plans for all public lands.

Based on its Resource Area and/or Districts, the BLM expects to have 136 RMP's. Of these, 57 have been completed and approved. It is expected that all 136 RMP's will be completed and approved by the end of fiscal year 1997. Thirty seven RMP's are currently in progress.

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#19. Please provide the process used by BLM to amend or revise resource management plans, including timeframes for amendment or revision.

Answer: The process for amending or revising a plan is in the regulations at 43 CFR 1610.5-5. It involves the following nine steps:

- identification of issue(s);
- development of criteria for planning, amending or revising;
- collection of inventory data and information;
- analysis of management situation;
- formulation of alternative(s);
- estimation of effects of each alternative;
- selection of a preferred alternative;
- selection of a resource management plan (revision or amendment);
- monitoring and evaluation;

Amending a RMP is initiated by monitoring and evaluation findings of the existing plan; or by new data which might affect the plan; or by new or revised policy; or by a change in circumstances; or by a proposed action (internal or external to BLM) which if implemented would result in a change in terms, conditions and/or decisions of the approved existing plan.

A revision of a RMP is initiated based on monitoring and evaluation findings, new data, new or revised policy and changes in circumstances affecting the entire plan or major portion of the plan.

The time frame for amendments is as short as 6 months or as long as 24 months, depending on the complexity of the amendment. Revising a RMP usually takes longer than amending, and is considered to take as much as 24 months.

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#20. **Please provide examples of minerals and mining activity currently being considered in resource management plans.**

Answer: On public lands where the disposal of energy and mineral resources is under the administration of the Bureau of Land Management, all minerals and mining activities taking place at the time or possible in the future are provided for in Resource Management Plans (RMP's). Guidance for energy and mineral resources input to RMP's is specifically given in BLM Manual Sections 1620, 1624, and 3031. The intensity and level of detail at which energy and minerals activities are considered in a specific area RMP depend on whether they have been identified as an issue. First of all, in each RMP a determination is made as to which BLM area within the total area included in the plan are available (or open) for activities related to leasable, locatable, or salable mineral resources. Once those areas are determined, then conditions under which different activities (exploration, development, and extraction) related to energy and mineral resources may take place are established.

For example, in the preferred alternative of the Medicine Bow-Divide Resource Area RMP, Wyoming, "resource accessibility" was identified as an issue to be considered. This includes access for exploration, development, and extraction of oil, gas, coal, and other mineral resources. Areas with present mineral production, as well as areas with potential (high, moderate, or low) for the occurrence of energy and mineral resources are identified on maps. Exploration, development, and eventually extraction may take place in these areas. It is estimated that over a 20-year period, coal mining will disturb an average of 200 acres per year; similarly, oil and gas activities might disturb 1,700 acres per year; and uranium mining activities might disturb 75 acres per year. Reclamation of the lands disturbed by energy and/or mineral resource activities is also considered in each RMP in general and in considerably more detail in plans of operation.

Another example comes from the West Hi Line RMP, Montana, where certain ares are open to mineral activities, but a plan of operations would be required for all activities including exploration, assessment work, development, as well as extracting mineral resources from the respective mineral deposit. Because of wildlife habitat, timing restrictions may be applied for mineral activities. Reclamation guidance would be applied to every plan of operations. Similar examples of mineral and mining activities are in each RMP.

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#22. How many times has BLM contested a mining claim in the past ten years?   (there is no question #21).

Answer: In the past 10 years, BLM has contested 3746 mining claims involving 515 case files. This includes 802 mining claims involving 93 mineral patent application case files. A breakdown by year is as follows:

Year	# of Cases	# of Claims
1979	110	687
1980	58	433
1981	59	310
1982	34	321
1983	46	467
1984	108	627
1985	25	219
1986	31	426
1987	24	105
1988	20	151
TOTAL	515	3746

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#23. Do you have any idea how old the 1.2 million recorded mining claims are?

Answer: Approximately 2.5 million mining claims have been recorded with the Bureau since the passage of FLPMA. A breakdown of the claims by year of location is as follows:

Year	Claims	Year	Claims
1850-1875	65	1977	156,329
1876-1900	1,708	1978	174,433
1901-1925	13,018	1979	172,331
1926-1950	31,815	1980	196,141
1951-1960	67,344	1981	212,689
1961-1970	257,428	1982	132,810
1971	23,186	1983	156,464
1972	18,522	1984	123,726
1973	28,536	1985	89,918
1974	55,165	1986	115,454
1975	61,507	1987	143,804
1976	93,538	1988	189,238
TOTAL			2,515,169

About 1.2 million of these are active, which means they have met the statutory requirements of Sec. 314 of FLPMA. We do not have a breakdown by year of location for the active claims only.

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#24. What activities qualify as assessment work? Should the definition of qualifying activities be changed?

Answer: Under the current Mining Law, the individual States are allowed to set the criteria as to what constitutes acceptable assessment work. It is usually labor and improvements expended which will promote the development and extraction of the claimed mineral deposit. Without consulting with the affected parties, we do not wish to speculate on what should be considered at this time. We will be happy to work with the Committee on this issue in the future.

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#25. **What are the typical royalty arrangements for hardrock mines on private lands between the landowner and the mining company? What are the typical royalties between the owner and a valid mining claim and the operator/mining company on federal lands?**

Answer: A private survey by industry sources shows that royalty arrangements between mining claim owners and mining companies on both private and Federal lands average 3.5% to 4.0% of the gross production value. The gross values are the values of the concentrates milled and shipped from the mine site and the royalty values given apply equally to mining operations on private and Federal lands.

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#26. **Are these royalties calculated on gross value or net income? If net, what are the typical deductions?**

Answer: Typically on gross value of the ore being produced at the minesite (value of the recoverable contained mineral[s]). The value is calculated as the gross value of the mineral concentrates as they are shipped from the property to the refinery.

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#27. **In general, what are the terms under which mining claims are transferred or sold?**

Answer: Mining claims are recognized by law as real property and as such are bought, sold, transferred, willed, or inherited as any other piece of real estate. (see Forbes v Gracy, 94 US 762 [1876]). Mining claims are generally sold subject to a net smelter return (royalty) of 1-3% or a gross royalty value (at the mill) of 3-5%.

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#28. **What is an appropriate claim size to reflect modern mining practices, reduce the amount of acreage tied up unnecessarily, and afford small miners an opportunity to maintain claims?**

Answer: We feel that 20 acres is an appropriate size for a mining claim. At this size it is readily conformable to the public land survey system, being a half of a quarter-quarter section, and can be located and described by aliquot parts. It is also a convenient size to handle on the ground by an operator or the Bureau field personnel. Without the input of the small miner, we decline to speculate as to the optimum acreage to be held by a mining claimant under location. However, we will be happy to work further with the Committee on this issue, in consultation with the affected constituents.

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#29. Various studies on the Mining Law have referred to an evolving change in mining activities from the mining of high-grade deposits found in veins to vary large low-grade deposits of ore, and a change in the industry from small miners to large enterprises. Is this change occurring? Has the Mining Law adapted well to these changes or has it complicated the process of putting together large mining operations?

Answer: The studies of the mining law have indeed made note of the change in orebody characteristics and the change in the type of mining company that ultimately extracts them. What the studies have failed to show is the change within the companies and the industry over the last 10 years and considerable economic change in the American base and precious metal exploration and mining industry. The changes and the ease with which the Mining Law has allowed the industry to respond to them are ample proof of the flexibility of the fundamental principles of the Mining Law. Those principles include the self initiation of mineral rights, the right of free access across Federal lands, the security of tenure to the mineral deposit, and the concept of due diligence, exercised in a business and regulatory environment that does not impose unreasonable up-front costs.

In the current North American mineral industry structure there is little in the way of grassroots exploration on the part of the larger companies, often referred to as "Majors", whose focus tends to be more on production than exploration. Exploration has, for the most part, been left to the small company and the individual operator, usually referred to as "Juniors". Junior operators often spend considerable time and effort to develop submittal properties to the Majors for consideration.

Precious and base metal mining has become increasingly concentrated in a smaller number of capital- rich companies that have ready access to the Asian and European capital markets. In contrast to the mining company "Majors", the exploration company "Juniors" tend to be capital- poor with limited cash reserves and limited access to capital markets of North America, Asia or Europe.

Customarily, a mineral property will pass through a cycle that begins with grassroots exploration making a discovery of a deposit of valuable minerals with development potential and the creation of a land package that is often referred to as a presentation or speculative property. The property, typically composed of a mixture of unpatented mining claims and private lands will be offered to a Major for evaluation if the Junior lacks sufficient funding to further evaluate the property or the strategy of the

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Junior company is to remain as an exploration oriented operation.

The results of the Major's evaluation may result in the property passing through pre-development and development phases and ultimately lead to production. Mineral properties with development potential are routinely acquired by larger companies on a buy-in basis, however, market forces often force properties into dormancy. If the costs of carrying the property in a dormant position are too high the options on the property will be dropped. Likewise, if the results of the Major's evaluation are not favorable, the options on the property will dropped and control of the property will revert to the Junior. In either instance, the property is a "dead" property from the corporate viewpoint. A typical mineral property in the historic mining districts of North America may pass through the cycle several times.

Northern Miner Press, Ltd., is a knowledgeable observer of the North American mining scene. Based on its most recent analysis of the US industry done in preparation for their revised industry handbook, it estimates that there are about 1150 companies active in the base and precious metals sector. Of these 1150, only about 250 have any production that can be called significant. They exclude small placer operations such as those found in Alaska. Put another way, **only one in four companies is a involved in extraction** and the remaining three out of four are either looking for potential properties or are starting to develop properties. Most of the companies in the industry are easily classified as Juniors.

Two recently permitted mid-sized precious metal heap leach operations involve surface disturbances on the order of 700 to 1000 acres. The total property requirement for a major mining company could easily be double in size, easily amounting to 70 to 100 mining claims. A smaller operator would likely accept 35 to 50 mining claims for a smaller operation.

In an informal poll of Majors, done through industry contacts made by the Mining Law Staff, a hypothetical exploration Junior with a budget of $1,000,000 would probably hold between 200 and 1000 mining claims, with an average number being about 500. As a rule of thumb, the company would be reasonably expected to spend $500,000 on overhead such as office rents, staff salaries, field vehicles, etc.

The remaining $500,000 would generally go into the evaluation of the mineral properties. Drilling costs for reverse circulation drilling range from $15-$20 per foot, while core drilling costs range from $25-$40 per foot. A typical "first pass" drilling program will have a $100,000 to $120,000 budget and involve 2,500 to 4,000 feet of drilling. Exploration geophysics and geochemistry programs that identify drilling targets will range in costs from $10,000 to $30,000 and $5,000 to $15,000 respectively.

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#30. In 1971, the Department sent a bill to Congress limiting on the number of acres per State that a claimant could hold. Is there a need to impose a limitation on the number of claims any one person or corporation may hold in one State in order to promote competition and prevent major operators from crowding out small miners?

Answer: No, as we noted in our answer to question Number 29, the structure of the industry has changed. Large blocks of claims while commonly found are generally an expression of a temporary land position being developed by a Junior. A hypothetical exploration Junior with a budget of $1,000,000 would probably hold between 200 and 1000 mining claims, with an average number being about 500. Properties to be presented to a Major would require an expenditure of funds to consolidate the information on the property. The typical Junior could expect to spend $500,000 on overhead such as office rents, staff salaries, and field vehicles. The remaining money would go to meeting costs such as those outlined in Question 29.

Mining companies generally hold sufficient acreage around an active operation at least large enough to support the appropriately sized operation (as determined by the corporate strategy), with sufficient room for expansion (should further exploration, market forces or technology turn poorly mineralized wall-rock into ore), and sufficient non-mineral land to allow construction of surface facilities such as leach pads, milling facilities, offices, and maintenance yards.

In one sense the current industry structure is now serving to limit the number of claims that can be held by a Major or a Junior. Majors don't want to pay taxes on property they are not utilizing and Juniors cannot afford to sit on properties. The addition of BLM's recordation fees can be expected to encourage some additional turnover in property. This state of affairs has eliminated the need for a government mandated limit on the number of claims that can be held in any one state and we see no need to return to such a proposal.

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#31. A recent GAO report stated that 3.2 million acres had been patented under the Mining Law since 1872. Do you agree with those figures?

Answer: Yes, since the beginning days of the Republic, a total of 1,144,380,000 acres has been patented under the Statehood acts, homestead acts, agricultural entry acts, cash entry, soldier bounty, and mineral laws. Since the year 1866, the year of the first mining law (the Lode Law of 1866, 14 Stat 251), and through fiscal year 1988, the Department has patented a total of 3,206,644 acres under the Mining Laws. This is 0.3% of all Federal land patented. Since 1920, only 1,248,242 acres have been patented. Over the last seven decades the average acreage patented per year has been declining:

Time Interval	Average ac/yr patented
1920-1940	32,762
1940-1960	16,325
1960-1970	8,355
1970-1980	3,535
1980-1988	12,606

The figure for the 1980 - 1988 interval excludes oil shale acreage patented as a result of the settlement of the TOSCO case and illustrates the results of a Departmental effort, initiated after Congressional prompting, to eliminate mineral patent application backlogs.

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#32. What has the trend been over the past ten years in terms of numbers of patent applications? Have they increased or decreased? Why?

Answer: The application rate has been variable and has reflected changes in the minerals market place, particularly in gold, bentonite, and base metals.

Mineral Patent Applications	1977	47	1983	55
	1978	33	1984	52
	1979	44	1985	63
	1980	45	1986	31
	1981	51	1987	74
	1982	75	1988	45

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#33. How many patent applications are challenged by the government? How many mining claims? What are the usual grounds for challenge? How long does it take to conclude a typical challenge? How much does it cost the government? How often does the government succeed?

Answer: In the last 10 years, BLM has issued contest complaints on 802 claims involving 93 applications.

The typical charges in contest complaints for lodes and placers concern lack of discovery or lack of economic feasibility. The typical charges in contest complaints for mill sites is that the mill sites are not used or occupied for mining or milling purposes.

The contest complaint process involves the following:

A. Mineral examination by the surface management agency.

B. Complaint issuance by BLM.

C. Complaint answer by contestee (mineral patent applicant).

D. Hearing by the Department's Office of Hearings and Appeals (OHA).

E. Decision by OHA.

F. Appeal to the Interior Board of Land Appeals (IBLA) filed by contestee or surface management agency.

G. Decision by IBLA.

H. Appeal filed by appellant (contestee) to U.S. district court.

The typical contest, following steps A-G, can take 3-4 years, with steps D-G taking the most time.

The typical cost to the Government is six months of staff time. The affected staff are, for the Bureau, a mineral examiner and a land law examiner; for the Department, a solicitor, an Administrative Law Judge, and three Administrative Law Judges on the Interior Board of Land Appeals. Total cost would approximate $20,000 per contest.

The Government prevails in 90% of the contest actions it initiates, both in the Administrative area, and in the Federal Courts.

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#34. How many claims do not have a valid discovery when they apply for a patent?

Answer: About half of the claims applying for patent fail due to lack of a discovery, adverse claim by a rival locator, or a title defect.

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#35. What are the most critical challenges for federal land managers in terms of land management, reclamation, environmental protection, and mitigation during the life of a mining operation?

Answer: The most critical challenge for the federal land manager is finding the personnel and the time to get personnel out on the ground during the life of the operation. Paper processing, during the decades of the 1970s and 1980s, has limited actual resource management, including the management of exploration and mining operations. While much of this paper management is necessary, the challenge to the Federal Land Manager is to accomplish the needed paperwork while retaining adequate resources, personnel and funding to allow appropriate monitoring of operations on the ground.

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#36. Should we consider using some of the fees generated by S 1126 to fund an abandoned mine reclamation fund for hardrock mines?

Answer: We do not favor the creation of an AML fund through the use of the fees generated by the proposed legislation. This position is primarily based on two conclusions. First, we conclude that a problem of the magnitude to warrant such a program does not exist. Second, none of the State agencies with whom we share a variety of surface management responsibilities have suggested the need for these additional provisions.

On the first point, whatever problems currently exist do not logically lead to the conclusion that an AML fund is prudent or necessary. The data generated by the GAO that is often utilized to support this proposal is technically flawed. An estimate of hardrock disturbance and the cost to reclaim the disturbance was made by GAO in a report published in April 1988. That report was based on a minuscule data sample and showed significant error factors.

With regard to the second point, in the spirit of continued cooperation with State agencies, we would be responsive to their future expressions on this subject. As yet we have heard no expressions of a need for such a fund from our State counterparts.

However, we would like to work with the Congress on finding out what the real problem is and how we can resolve any problems which may be discovered concerning reclamation of abandoned operations sites.

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#37. Do you generally agree with the General Accounting Office's figure in a 1986 report that reclamation of 281,581 acres of currently disturbed federal land will cost $284 million?

Answer: We find the GAO estimate of disturbance and cost to be so inaccurate as to render the estimate meaningless. The size of GAO's sample of the data selected as a base on which to make the projection was clearly too small and the resulting errors render the report insufficient for management purposes.

Simple inspection of the results found on pages 25, 26, and 27 of GAO report GAO/RCED-123BR shows sampling error "factors" seldom less than plus or minus 25 percent and achieving levels of plus or minus 75 percent to 86 percent. The report asserts a confidence level of 95 percent for the sampling errors. This means that GAO is confident that its estimates of disturbance and costs reflect a "real" estimate that may at best be 25 percent smaller or 25 percent larger. This is comparable to aiming at a target 10 feet wide, but scoring hits or misses on a 15 foot wide target. With the greater sampling errors shown in this report, the expanding target grows to outrageous proportions.

With respect to the estimate of costs, we note that the costs borne by various Federal and non-Federal agencies are overwhelmingly based on Abandoned Mine Lands (AML) and Superfund examples. First, neither category provides a useful estimate of reclamation costs that would be borne by an agency or an operator who may choose to reclaim preexisting disturbance as a part of the normal course of operations. These two categories of costs would necessarily include the administrative and overhead costs of the involved agencies plus the costs of a contractor to mobilize and demobilize equipment, meet payrolls and achieve a proper profit. All of these items would tend to inflate costs. Second, most of the types of disturbance being reclaimed by AML or Superfund sites would involve mining as opposed to exploration related disturbance. This type of reclamation or cleanup activity, particularly Superfund actions, must achieve operating and final stabilization standards far in excess of those normally required by mining operations. Most exploration disturbance is of a much less permanent nature.

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#38. How many acres of public domain land are withdrawn from the Mining Law?

Answer: The Bureau of Land Management (BLM) has not compiled this statistic accurately. We estimate that of the 700 million acres of Federal mineral estate, which includes acquired lands and those with private surface rights, that 306 million acres are unavailable to entry under the Mining Law of 1872. Given the time constraint of 204(l) of FLPMA to complete withdrawal review, BLM concentrated its efforts on identifying all withdrawals and determining gross acres withdrawn so that the review process could begin as quickly as possible. The inventory completed in January 1980 and the updated inventory completed in December 1980 showed over 51 million acres of withdrawn land which could be subject to section 204(l) withdrawal review. Not all withdrawn land is closed to mining. Furthermore, a withdrawal may only close public lands to certain types of mining. For instance, many withdrawals only closed public land to non-metalliferous mining under the Mining Law and the land remained open to metalliferous mining and mineral leasing. Due to the existence of many overlapping withdrawals, a gross acreage figure for lands closed to mining would be somewhat exaggerated and not truly reflective of the on-the-ground situation.

Once all withdrawal data is in-putted to the BLM's Automated Lands and Minerals Record System, we will be able to provide the requested information. This should be accomplished by January, 1992.

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#39. **What is the status of the Department's withdrawal review program?**

Answer: As stated in the response to question #38, a 1980 inventory identified over 51 million acres of withdrawn land, involving some 16 Federal agencies, as being subject to FLPMA Section 204(l) withdrawal review. Field offices have completed work on approximately 36.5 million acres thus leaving 14.6 million acres to be reviewed. In 1985, preliminary recommendations to terminate a number of withdrawals were held at the request of the Assistant Secretary pending the outcome of a lawsuit by the National Wildlife Federation (NWF).

BLM State offices are continuing to perform withdrawal reviews at the field level and to develop recommendations for those withdrawals. However, no actions are being forwarded to the President pending resolution of the NWF lawsuit. On June 21, 1989, the Circuit Court of Appeals for the District of Columbia ruled in favor of the NWF and returned the case to the District Court for trial on the issues.

Since the National Wildlife Federation litigation is still pending, no recommendations by the Secretary through the President to the Congress have been made. Once the litigation is resolved, BLM may be in a position to start forwarding completed reviews with recommendations to the Secretary.

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#40. **How large, on the average, is an ore body? How many mining claims must be staked to mine the ore body?**

Answer: This question cannot be answered without reference to the type of deposit being discussed. Small lead-zinc deposits will cover 30 acres in rectangular form. The current type of gold deposit being mined in Nevada will easily cover 200 acres in square or rectangular form. Bedded deposits of limestone, gypsum, and diatomaceous earth can cover several sections (at 640 acres/section) of land. The geologic evolution of the deposit will determine its three-dimensional aspects and the amount of acreage that will need to be located under mining claim to cover it and keep competitors at bay. At 20 acres/claim (currently claims are rectangles), mining claim coverage will very from 12-30 for the small lead-zinc deposit, to 50 - 100 each for the Nevada gold deposits, to 500 or so for a major bedded deposit.

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#41. How many patented and unpatented mining claims exist on lands that, since these claims were located, have been withdrawn from the Mining Law of 1872, including lands within the National Park System, the Wilderness Preservation System, wildlife refuges, etc?

- **o - How many patents have been put to non-mining uses?**
- **o - How many active mining operations are operating on these lands?**

Answer: We do not know the total number of patented and unpatented mining claims that exist on lands that, since location, have been withdrawn from the Mining Law of 1872. The only information of this type that is available is for National Park Service (NPS) administered lands. On these lands the total number of patented claims in the U.S. is 767, of which 557 are in Alaska. On NPS lands the total number of unpatented claims is 1,462, of which 1,083 are in Alaska.

A single patent may contain one mining claim of 20 acres or less, or it may include a group of mining claims, all of which are 20 acres or less, which in a very few instances may add up to several hundred acres. NPS records indicate that at least eight patents on NPS administered lands have been put to non-mining uses, including a casino and hotel, a housing subdivision, hunting and fishing camps, and a tourist resort with a golf course.

Currently only 4 active mining operations exist in the units of the National Park System. Since 1985 the number of mining operations inside parks has been greatly reduced. This has primarily been due to a Federal court order prohibiting the NPS from approving plans of operations until the completion of three Environmental Impact Statements (EISs) evaluating the cumulative impacts of mining in Denali, Wrangell-St. Elias, and Yukon-Charley Rivers National Parks and Preserves. The EISs are currently available for public review in draft form with final decisions scheduled for late fall 1989.

We, as yet, have no comparable data in the Washington Office, for lands administered by the Fish and Wildlife Service (FWS). That data will be assembled by FWS field offices and transmitted to you once it has been received by the Washington Office.

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#42. The Mining in the Parks Act allows the Secretary to regulate mining activities on patented and unpatented mining claims in parks. What authority does the Secretary have to regulate non-mining uses on patented claims? Is more authority needed? Would restricting patents to the minerals only enhance park resource protection and management? Is there adequate authority to regulate these activities on lands other than within parks (i. e. Wilderness Areas)?

Answer: The National Park Service (NPS) regulates mining on patented and unpatented mining claims in the National Park System through the regulations at 36 CFR 9, Subpart A, under the authority of the Mining in the Parks Act (16 USC 1901, et seq). The NPS has limited authority over non-mining uses on patented mining claims or other private lands within the National Park System.

As to the question of additional authority, when necessary, the NPS works cooperatively with affected parties to protect park resources from those non-mining uses on private lands that are in conflict with Congressional mandates regarding the National Park System.

Except for those areas specified by the Congress (see 43 CFR 3826), patents issued within the National Park System convey surface as well as mineral estate. In those areas where conveyance of a patent which includes the surface rights and which would conflict with NPS goals, the NPS has the authority to pursue several avenues, including, but not limited to approval of plans of operation or acquisition. In other areas, such as Wilderness areas, Congress has already restricted conveyance of patents to the mineral estate. Therefore, we believe there is adequate authority to regulate mining activities on these lands.

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#43. Is the Bureau of Mines doing any research on problems such as acid drainage from abandoned hardrock mines? What are the results?

Answer: The Bureau of Mines conducts extensive studies of acid mine drainage from both hardrock and coal mines, and from mine waste and mill tailings disposal areas under its Environmental Technology Research Program. Development of a sound, scientific understanding of the hardrock acid drainage problem is critical not only to protection of human health and the environment, but it is also necessary to provide a sound basis for development of solid waste regulations by EPA and the states. The EPA is currently developing such regulations under the Resource Conservation and Recovery Act (RCRA). In addition, acid drainage and metals contamination are problems at many Superfund sites located primarily in the western states.

Current research is focused in the following areas:

o Understanding the dissolution mechanisms that cause acid formation and release of heavy metals.

o The importance of hydrologic factors in the recharge of acid producing areas and in the transport and fate of contaminants.

o Development of innovative chemical treatment processes to neutralize acidic waters and to recover toxic metals.

o Development of passive biological treatment and control processes to inhibit acid formation and to remove heavy metals.

o Development of sound techniques for mine closure that will prevent or minimize the possibility of future environmental damage caused by mine drainage and metals migration.

The Bureau of Mines is providing technical assistance to the EPA at a number of Superfund sites involving hardrock acid drainage problems. These sites include: Smelterville/Bunker Hill Mine, ID; Iron Mountain Mine, CA; Clear Creek, CO; Anaconda Smelter, MT; Silver Bow Creek/Butte, MT; Cherokee County/Tri- State Mining District, KS; and Palmerton Smelter, PA.

While the Bureau's emphasis in hardrock mine drainage is relatively recent, research on coal mine drainage has been going on for many years and has been highly successful. Some of the expertise developed on coal mine drainage problems is able to be transferred to the hardrock area. Nearly 5000 miles of streams, primarily

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located in the Appalachian region, are polluted by acid drainage from abandoned coal mines. Active mines are required by law to treat their mine drainage before releasing it to streams. It is estimated that the U. S. mining industry spends over $1 million per day to treat acidic water.

Recent Bureau developments in treatment of coal mine drainage include the In-Line System (ILS), a lower cost process for neutralization and removal of iron, and the use of constructed artificial wetlands for treatment of drainage from abandoned mines. In the wetlands technology, biological processes remove metals, principally iron and manganese, from the water. Over 300 small artificial wetlands have been constructed at mine sites during the last 3 years. Most of these wetlands have proven to be an effective, low cost, low maintenance method for improving water quality.

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#44. Please provide a comparison of exploration success and failure rates for oil and gas development, and any studies or statistics to substantiate such comparison.

Answer: According to the IPAA of September , 1987, in a report entitled Oil and Gas Producing Industry in Your State 1987-1988, the success rate for exploratory wells has been gradually declining over time. Recent Nationwide statistics show the ratio of discoveries per number of wells drilled.

Year	Discovery ratio
1980	1:3.30
1981	1:3.33
1982	1:3.40
1983	1:3.49
1984	1:4.15
1985	1:4.06
1986	1:4.11

We do not have statistics on the discovery ratio for locatable minerals at this time, but based on industry contacts, it is expected that the ratio will be several orders of magnitude higher than for oil and gas.

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#45. If a royalty were to be imposed on a hardrock mineral production, how should such a royalty be structured and administered?

Answer: We oppose a hardrock mineral royalty system because it would be virtually impossible to administer. The complexities and variabilities inherent in "hardrock" mineral economics, mining, processing, and marketing make setting one fair royalty scheme for the entire industry very difficult. Multiple or commodity-specific royalty schemes would be open to challenge as arbitrary and hard to administer. All require careful study.

In general, "hardrock" mineral production occurs in three steps: mining (extracting ore), milling (concentrating ore), and smelting (refining ore). Market conditions determine when, where, and how these steps occur. Each step produces a product with added value. The marketplace also determines the type of economic arrangements that are made between the miner, miller, and smelter. The myriad of technical and economic factors at play here are beyond the scope of this reply. But suffice it to say that many different market situations exist.

Given the complexities outlined above we offer here a royalty collection method that may circumvent some of the complexity and deserve further consideration. The royalty should be charged as some percentage of the gross value of the concentrate at the point of sale. This is already being done for BLM administered acquired lands in the lead-zinc-copper district of Missouri. The royalty there is set at 5% and is collected by MMS. These royalties are based on assays of the concentrate and market price at the time of sale. The Minerals Management Service would be the appropriate government agency to administer royalty collection.

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#46. Please provide all available information on any mining claims and patents being acquired by the Department of Energy for the Yucca Mountain nuclear repository site, including number and status of mining claims, number of patented mining claims, and acquisition costs.

Answer: There are 31 mining claims on the Yucca Mountain site. We understand that DOE has acquired 27 of them and is negotiating for the other 4. We do not have any information concerning DOE's acquisition costs, as they are internal to DOE.

Senator McClure
Questions for Director Burford
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1. Does the Bureau of Land Management have sufficient authority to manage surface use in relationship to mining activities?

Answer: Under the authority of Section 302(b) of the Federal Land Policy and Management Act of 1976 (FLPMA), and the Secretary's plenary authority to manage the public lands under 43 USC 2 and 1201, the BLM has the necessary tools to manage surface use in relationship to mining law activities. We are constantly reviewing the sufficency of our authorities however, and would be pleased to join with the Congress and the Committee in any review of the sufficency of those authorities. The surface management regulations found at 43 CFR 3802 and 43 CFR 3809 cover wilderness study areas and all other BLM surface managed lands respectively. Additionally, the 43 CFR 3712 regulations, which derive their authority from PL 84-167 (30 USC 611-615). This Act requires occupancy of a mining claim for mining purposes only. These combined statutes give the Department sufficient legislative authority to manage surface disturbance of the public lands under the Mining Law of 1872, as well as any other form of surface disturbance.

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2. **After patenting, what authority is available to the Bureau of Land Management to handle mining activities?**

Answer: Except for certain special acts controlling limited geographic areas, there is no authority available to BLM to "handle" mining activities after a patent has been issued. Likewise the BLM has no authority to handle any activity taking place on patented land because the land is no longer under federal jurisdiction. However there are a great variety of Federal, State and local laws and regulations which are used to regulate such operations. One large gold producer in Northern California reported that it was required to obtain 327 permits prior to conducting operations. Often BLM is involved in the process, either through invitation as an adjacent landowner, a party with a small, non-critical portion of the operation on its lands, or as a source of expertise in such matters.

The special acts are the Mining in the Parks Act of 1976 (90 Stat 1342), §601 of FLPMA for the California Desert Conservation Area (90 Stat 2784), and §6 of the Act of October 21, 1970 (84 Stat 1070) [The King Range Conservation Area]. These Acts require that the patentee conform his use of the surface of his patented land to the land use plan and surface management regulations of the Secretary of the Interior.

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3. In your testimony, you state that the mining law has accommodated changes, particularly with respect to environmental control and land use planning. Please elaborate on those changes.

Answer: The 1872 Mining Law does require that all mining claimants conduct themselves "...under regulations prescribed by law..." (30 USC 22 [1982]) and may hold and occupy their mining claims "... so long as they comply with the laws of the United States..."(30 USC 26 [1982]). The surface management regulations, promulgated under the authority of § 302(b) of FLPMA, § 22 - 54 of Title 30 U S Code (the 1872 Mining Law), and § 2 and 1201 of Title 43 US Code (the Secretary's plenary power over the public land), require compliance with the National Environmental Policy Act (NEPA) and all other Federal and State environmental laws.

The preparation of a mineral deposit for production typically requires over 85 separate permits, encompassing the Federal, State, and local regulatory framework. Permits are required for meeting NEPA, Clean Air and Water Acts, reclamation requirements, public health and safety, building codes, hazardous materials handling and disposal, and other ancillary matters. None of these items are mentioned in the 1872 Mining Law directly, but legally they are all covered by the language cited above in Title 30 USC § 22 and 26.

This language provides the flexibility needed for the 1872 Mining Law to stay "in tune" or "in step" with the changes in legislation or public land use policy and removes the need to amend the 1872 Mining Law every time Congress passes legislation concerning land use or the environment.

All of BLM's Resource Management Plans (RMPs) address the "hardrock" minerals within the energy and mineral resources (E&MR) portion of the RMP. The land use plans focus on mitigation and reclamation requirements needed if mining were to occur. These documents and contained operational requirements become the basis for the necessary Bureau mitigation requirements that are attached to an operating plan filed pursuant to our Surface Management regulations.

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4. In your testimony, you state that the mining law has worked well for over a century and is "fair, efficient and predicable." Please elaborate upon that statement in light of your eight years at the helm of the agency charged with the mining law's administration.

Answer: We feel that the Mining Law of 1872, as amended, has served this Country admirably for the last 117 years. It has allowed the domestic minerals industry to rapidly adjust to changing economic conditions and world wide market forces, all without Government intervention or taxpayers money. It has built the foundation upon which our current industrial capacity stands upon and continues to contribute substantially to it.

This is not to say that changes in the mining law should be forever barred from consideration. Periodic review of the laws and policies that guide mineral development is always to the benefit of the public.

Review of the Mining Law can be useful as long as certain basic principles are adhered to. Self initiation of mineral rights, free access across Federal lands, security of title, and the inclusion of a rational diligence mechanism are the keys to the success of the Mining Law and to any revisions to the Mining Law.

The 1872 Mining Law, as amended, is a market driven system. It allows the industry to shift from one mineral commodity to another to meet market conditions with very little lag time. Governmental approval is not required for land acquisition or commodity selection, as in a leasing system. Mining disturbances are regulated by the agencies so that reclamation can occur and the land can be restored to other uses. Erosion control and safety factors are met.

Revenues are generated under the 1872 Mining Law, but not as royalties. The revenues are paid to the Treasury as income taxes. Revenues are also paid to the States as business taxes, payroll taxes, property taxes, and in some cases, severance taxes.

In addition, one of the greatest benefits of the 1872 Mining Law is that it places the cost and the risk of exploration on the private sector, where it is driven by market conditions at no cost to the taxpayer.

Senator Burns
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1. Has the Bureau of Land Management or the Bureau of Mines detected any trend of American mineral exploration companies to move overseas in the exploration efforts?

Answer: There has not been a trend for American mineral exploration companies to move overseas in their exploration efforts. Since the early 1980's, the major observable trend, except in the past few years, has been the general reduction in American mineral exploration activities in both the U.S. and overseas. This is not to be taken to mean that a trend to move overseas will not develop in the near future.

Historically, U.S. mining companies have been major investors in international mining exploration. During the mid 1960's and early 1970's U.S. industry invested very large sums in developing minerals mining projects throughout the world. Australia, Brazil, Chile, and Canada were major beneficiaries of these investments.

With the advent of the oil crisis and the ensuing world recession, there was a continuing downtrend in the profits of mining companies worldwide. Many U.S. companies, in an effort to survive, made major cutbacks on those expenditures not essential for the short term survivability of the firm. As a result, until recently, there was a decrease in the exploration and mine evaluation departments in most companies. The total number of personnel actively working for U.S. mining companies in the U.S and overseas today is, therefore, but a fraction of what it was in the early 1980's.

Now that U.S. mining companies have significantly improved their profits and are experiencing favorable cash flows, there has been a general increase in exploration. The exploration being undertaken, however, is much more oriented towards precious metals, such as gold and platinum, than was the case in earlier periods. U.S. mining companies today, however, are involved in a much smaller proportion of total world minerals exploration than was the case a decade ago.

In order to obtain a better view of what is occurring internationally in the exploration area, one must now examine the efforts of large international (non-American) mining companies. Two of the largest mine development projects (the Escondida copper mine in Chile and the Olympic Dam mining project in Australia) are not funded by U.S. investments. Escondida involves RTZ and BHP, whereas Olympic Dam is a B.P./ Western Mining project.

Senator Burns
Questions for the Interior Department
Hearing on the Mining Law
June 7, 1989

2. **What effect does the Bureau of Land Management and the Bureau of Mines think the Mining Law of 1989 would have on the minerals exploration industry?**

Answer: The Department is currently studying the potential effects that S 1126 will have upon the domestic minerals industry and the Department's ability to manage our mineral resources under that proposed legislation. When this review is completed, we will be back in contact with you with our findings.

United States Department of Agriculture
Forest Service
Washington Office
12th & Independence SW
P.O. Box 96090
Washington, D.C. 20090-6090

Reply To: 1510

Date: JUL 07 1989

Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral
Resources Development and Production
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

Enclosed are our responses to the questions included with your June 13 request relating to the recent hearing on the Mining Law of 1872 and S. 1126, the "Mining Law of 1989."

Sincerely,

George M Leonard

F. DALE ROBERTSON
Chief

Enclosures

QUESTIONS
SENATOR BINGAMAN
HEARING ON THE MINING LAW OF 1872

MR. GEORGE LEONARD
U.S. FOREST SERVICE

1. What do you see as the Mining Law's greatest strength and its greatest weakness?

A. We see the Mining Law's greatest strengths as falling into three general areas: (1) It provides certain statutory rights to miners, including entry (access), occupation, development and production of the mineral resource, and security of tenure; (2) There exists self-initiation of those rights by the mineral proponent; and (3) The law is flexible and adaptable to changing environmental laws.

The greatest weaknesses of the 1872 Mining Law are: (1) The current process for resolution of unauthorized residential occupancy or title clearance is complex and time consuming and the burden is placed on the Federal Government to efficiently resolve unauthorized residential occupancy of unpatented mining claims or to clear title to lands pursuant to land exchanges or other transfers. (2) There is confusion in distinguishing between common variety materials (collectively referred to as mineral materials) which are sold under authority of the Materials Act of July 31, 1947, as amended by the Act of July 23, 1955 and uncommon variety materials which are considered to be locatable minerals and disposed under authority of the 1872 Mining Law; and (3) There is no time requirement for discovery. Lacking this requirement, some lands may be occupied for speculation or with only minimal mining activity. The encumbrance on the title imposes an additional management workload on the Forest Service. In addition, the doctrine of "pedis possessio" (see answer to question No. 3) may exclude other users from the area because of the need of the claimant to protect his or her rights in a forceful, confrontational manner.

2. To what extent does the Forest Service have discretion to prohibit mining in environmentally sensitive areas?

A. Our locatable mineral regulations (36 CFR 228, Subpart A) and other laws and regulations administered by the Forest Service or other Federal and State agencies provide adequate authority to control or mitigate damage to resources. However, it may not be feasible to prohibit mining in some circumstances. For example, if a Forest Service administrative action imposes a requirement that devalues the claimant's rights to develop their property, that action may constitute a taking for which the Fifth Amendment of the Constitution requires the payment of just compensation.

3. Is there a security of tenure problem prior to a discovery of a valid mineral deposit under the Mining Law of 1872? If so, how could this be resolved?

A. Yes, in some cases. A person, who is actively exploring a prospect, desires protection for the time necessary to discover valuable minerals from other persons who may also wish to explcre the same land. The current mining law does not provide this. The courts have recognized this problem and arrived at the doctrine of "pedis possessio" to provide protection to the claimant. Under this doctrine, a claimant may exclusively hold claims while diligently and actively working toward making a discovery. To claim the rights, there must be actual physical possession of all the ground, diligent bona fide work must be carried out and directed toward making a discovery, and other persons must be excluded.

It is common exploration practice to locate a large block of claims over and around an area where it is suspected that deposits of valuable minerals may occur. The locator of such blocks must try to maintain exclusive possession and pursue a discovery on each claim. The possession or occupancy of the claims must be more than mere presence. Geophysical testing and geochemical work, unless followed immediately by drilling, may not be sufficient. The exclusion of others requires positive action. Rights are lost if an adverse claimant is permitted to enter the property peacefully. Because of the "pedis possessio" doctrine, it becomes necessary for claimants to forcibly deny entry to intruders. If confrontation occurs, and sufficient force is used by the entering party, the denial of entry need not be successful. The claimant or agent simply yields to force, and then pursues a legal recourse.

One possible remedy for this situation would be to amend the 1872 Mining Law to give the senior mining claimant an exclusive right of possession of the land included within the limits of their location for the purposes of exploration, development, production, mining, processing of minerals, and reasonably necessary associated surface and subsurface uses prior to and following discovery of a valuable mineral deposit. The Federal Government should receive benefits in return for allowing such additional rights over public land.

4. To what extent does the "small miner" contribute to the development of commercial deposits?

A. Before answering this question, we need to define the term "small miner". We generally think of a "small miner" as one who employs fewer than 20 people, has a capitalization of less than $1 million, is not on the major stock exchanges, and whose gross value of annual production is less than $5 million. The "small miners" conduct much of the basic prospecting and exploration today as they have historically. Because they have a low capital position, they seldom operate a producing mine unless it is a small-scale mine that requires little capitalization and a small workforce. Most often, the "small miner" finds attractive prospects and then submits them to medium and large "majors" (mining companies who do the development work and put the properties into production). According to some sources, a significant portion of recent locatable mineral discoveries and current U.S. production of locatable minerals has come from small to medium-sized companies that were not in existence 10 years ago.

5. To what degree are non-mining activities conducted on mining claims? What, in your opinion, can be done to improve this situation?

A. We estimate that non-mining activities occur on less than 1/2 percent of mining claims located on National Forest System lands. However, the publicity surrounding non-mining uses, particularly unauthorized residential occupancy of mining claims within portions of certain National Forests, makes the problem seem more widespread than it really is. Nonetheless, it does place a considerable administrative burden on the Forest Service to investigate each individual case. We are aware of several hundred specific cases that have been resolved over the last 5 years.

Increased administration of mineral operations or amendments to the 1872 Mining Law may be necessary to require that a mining claim only be occupied for the purpose of exploration, development, production, mining, processing of minerals, reasonably necessary associated surface and subsurface uses, and the right of access to and across Federal lands for this purpose.

SENATOR BUMPERS--QUESTIONS
HEARING ON THE MINING LAW OF 1872
June 7, 1989

GEORGE LEONARD
UNITED STATES FOREST SERVICE

1. Please supply the Forest Service's annual budget and FTE's for administrating the Mining Law program on national forest lands for each of the past 10 years, including the costs of surface management activities. Please break down these costs by activity.

A. Year	Total Mining Law Program Budget($)		Surface Management Activities Budget($)		Total FTE's
1979	4.305	Million	2.872	Million	99
1980	4.270	Million	3.962	Million	70
1981	5.311	Million	4.617	Million	87
1982	6.542	Million	5.417	Million	97
1983	7.909	Million	5.589	Million	106
1984	8.985	Million	5.031	Million	110
1985	9.300	Million	5.125	Million	105
1986	8.964	Million	5.272	Million	111
1987	8.912	Million	7.106	Million	141
1988	9.606	Million	7.774	Million	139
1989	11.660	Million	8.202	Million	153

Note: These figures include all costs relating to mineral management activity and support to the mineral program from other areas, but do not include unrelated management activities not associated with minerals operations, such as special-use permit administration.

2. How many acres of national forest lands are under claim?

A. There are approximately 500,000 mining claims on National Forest System lands, primarily in the West, which encompass approximately 10 million acres.

3. Do you know if assessment work is being performed each year on these mining claims?

A. There is no requirement that the claimant notify the Forest Service when assessment work is being performed, unless the scale of assessment activities requires the submission of a notice of intent or plan of operations under our locatable mineral regulations (36 CFR 228, Subpart A).

4. How many acres of national forest lands disturbed by the Mining Law are currently unreclaimed? What will be the cost of reclaiming these lands, and who will pay this costs?

A. We estimate that approximately 44,000 acres of National Forest System lands nationwide are currently disturbed and unreclaimed as a result of ongoing locatable mineral operations. About 100,000 acres more are in various stages of reclamation as a result of locatable operations since 1974. (We do not have reliable date prior to 1974.) The estimated average cost per acre to reclaim these lands is $425. We require the operator to perform the necessary reclamation. If the operator fails to do so, the Forest Service recovers the operator's bond or financial guarantee and pays to have the necessary reclamation completed.

5. How many active mining operations are there currently on national forest lands?

A. As of April, 1989, the Forest Service has 7,067 active mineral operations, which include 3,433 notices of intent and 3,634 plans of operation. Of these active operations, 1,209 are producing mines.

6. How many notices of intent or plans of operations have been filed per year on national forest lands for the past 10 years?

A. The figures below show the estimated number of active notices of intent and plans of operations on file each year for the past 10 years and, for 1989, the projected number that will be on file by the end of summer. We have observed that the ratio of notices of intents to plans of operations is consistently around 50 percent. Our records are not categorized to reflect the number of new notices and plans received each year. Since nearly all notices and many plans have only one-year terms, we estimate that 60-80 percent of the following figures are new submissions each year.

Total Active Notices and Plans

1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
2,611	3,602	4,197	4,925	5,081	4,574	4,659	4,793	6,460	7,067	7,456

7. What is the cost of processing or administering the notices of intent or plans of operations?

A. The average cost of processing and administering notices of intent and plans of operation over the past 10 years was $1,100.

8. How many plans of operation have been denied by the Forest Service in the past 10 years?

A. Over the past 10 years, the Forest Service has denied an estimated 50 plans of operations which fall into the following 6 categories:

(1) within wilderness areas where valid existing rights were not established; (2) within withdrawn areas where valid existing rights were not established; (3) the material was not locatable; (4) placer operations in prohibited areas; (5) operations on private land; and (6) construction of structures that were not reasonably incidental to, or required, for mineral operations.

Although only a few plans of operations have been denied during this period, it is important to note that the vast majority of all plans of operations are not approved as submitted, but modified to various degrees in order to mitigate environmental impacts.

9. Does the Forest Service conduct on-site inspections of mining claims? If so, please supply the number of on-site inspections of mining claims that have been conducted each year on national forest lands for the past 3 years. Detail what type of inspection was conducted, and any actions taken as a result of such inspection.

A. The following table summarizes estimated data from Forest Service field units on the number and type of on-site mining claim inspections (under 36 CFR 228, Subpart A) conducted the past 3 years and actions taken as a result of such inspections.

On-site Inspections	1986	1987	1988	TOTALS
Compliance	5887	5602	7194	18,683
Reclamation	2473	2605	3677	8,755
Environmental Studies	3020	2267	4326	9,613
TOTAL INSPECTIONS	11,380	10,474	15,197	37,051

Actions Taken	1986	1987	1988	TOTALS
Release Bond	1190	949	1493	3,632
Increase Bond	233	230	279	742
Notice of Noncompliance	207	229	410	846
Civil Action	21	20	254	295
Criminal Action	18	15	25	58
TOTAL ACTIONS TAKEN	1,669	1,443	2,461	5,573

10. How many bonds (financial guarantees) currently are posted for mining operations on national forest lands? What percentage of total mining operations is this? What are the amounts of the bonds (financial guarantees)?

A. Under our locatable minerals regulations (36 CFR 228, Subpart A), approximately 85 percent of all Forest Service plans of operations (3,090) have financial guarantees. These guarantees range from $100 to $9.4 million with an average value of $5,100. The frequency of values is estimated to be as follows:

Over $1 million	< 1 percent
$25,000 -- $1 million	10 percent

$5,000 -- $25,000	15 percent
$1,000 -- $5,000	60 percent
Less than $1,000	15 percent

11. Is there currently flexibility in the types of security or bonding required? What alternatives to bonding are available? What type of security does the Forest Service recommend?

A. Yes. We are aware that some small mine operators have difficulty obtaining financial guarantees in the form of surety bonds because many insurance companies will not bond small mine operators unless they provide substantial collateral. Our locatable minerals regulations, policies, and instructions provide for the acceptance of various types of financial guarantees in addition to surety bonds. These include the posting of cash, irrevocable letters of credit, certificates of deposit, and savings accounts. This flexibility allows mine operators to choose the type of guarantee most compatible with their financial situation while protecting the Government's interests. The Forest Service does not recommend any specific type of financial guarantee over another and believes that a range of guarantees types provides adequate protection.

12. How many operators have lost bonds (financial guarantees) due to failure to comply with a plan of operations or for failure to reclaim? Are such operators treated any differently in terms of bonding or approval of plans of operations in the future?

A. Annually, the Forest Service needs to recover only 1 percent or less of it's plans of operations' financial guarantees (less than 30 plans). Surety bonds represent about one-third of that number. Generally, such operators are not treated differently in regard to bonding or approval of plans of operations, but the Forest Service will increase the frequency of compliance inspections to ensure that future problems do not develop.

13. The Forest Service estimates that the value of annual hardrock mineral production on national forest lands is $694 million. How was that figure derived? Can that figure be broken down by state and mineral? Does the Forest Service need any additional authority to collect accurate information, including the amount and value of production, for hardrock mining operations on national forest lands?

A. The $694 million figure represents a combination of the estimated market value of hardrock and mineral material production on National Forest System lands. The specific figure for seven selected locatable (hardrock) minerals for 1988 is estimated to be $650 million. Obviously, the total value of locatable mineral production from the National Forest System would be much higher if all locatable mineral commodities were recorded.

The $650 million figure was obtained from results of a survey of each Forest Service Region, beginning in 1986 and updated yearly. The survey questionnaire asked for the estimated annual production figures for seven selected locatable mineral commodities (lead, copper, molybdenum, gold, silver, uranium, and limestone), as well as production figures for mineral materials, and energy and nonenergy leasable minerals. These production figures can be broken down by Region, Forest or State.

There currently is no requirement for the Forest Service to report locatable mineral production figures. Collection of this information has been an added workload on field personnel who have many other responsibilities. Additional authority to require operators to report this information to the Forest Service would benefit our budget and planning efforts.

14. Please describe the Forest Service's role vis-a-vis the BLM under the Mining Law. Would the administration of the program be more effective if the Forest Service administered the entire program?

A. The Secretary of the Interior through the Bureau of Land Management (BLM), and the Secretary of Agriculture through the Forest Service share the responsibility for mineral management on the National Forest System. The Forest Service has overall surface management responsibilities for locatable mineral operations on the National Forest System. Under an April 1957 Memorandum of Understanding (MOU) with the BLM, the Forest Service conducts mineral examinations for purposes of mining claim patents, mining claim validity examinations, mineral in character determinations, valid existing rights determinations, etc. on National Forest System lands. If the Forest Service recommends contest action against a mining claim, the BLM's role is to determine that the elements of a contest are present and, if so, serve the claimant with a mining claim contest complaint. The MOU provides an effective approach to the administration of the program.

15. Please provide a step-by-step explanation of Forest Service interaction with mining operations from prospecting through reclamation and bond release.

A. Anyone proposing mineral operations under the 1872 Mining Law in the National Forest System that might cause disturbance of surface resources, must give the local Forest Service office a notice of intent to operate. If, after review of this notice, the authorized Forest Service officer determines that such operations will cause a significant disturbance to the environment, the operator must submit a proposed plan of operations. If the operator is unsure of what information is required or how to develop a plan, the District Ranger can assist the operator in looking at proposed access routes and in developing a reclamation plan and bond.

When the operator submits a plan, the authorized Forest Service officer reviews the plan for adequacy and, if found adequate, does an environmental assessment of the proposed plan (an environmental impact statement (EIS) may be required based on the degree of environmental impact). If the proposed operation is significant enough to require reclamation, the operator may be required to furnish a bond commensurate with the expected cost of rehabilitating the area. The authorized Forest Service officer calculates the bond amount. Once the bond has been submitted and the plan approved, the operator may begin operations. The authorized Forest Service officer will periodically visit the operation to see how the operation is going and whether it is within the parameters of the approved plan. If a part of the operation is outside of the approved plan, the authorized Forest Service officer works with the operator to bring the operation into compliance with the regulations.

When all or part of the operation has ceased and reclamation begun, the authorized officer periodically visits the site. The purpose of these visits is twofold: (1) to review ongoing reclamation for adequacy and (2) to help the operator, if needed, in determining proper reclamation methods. The authorized officer can release part of the reclamation bond each time the operator satisfactorily completes each stage of the reclamation. When the operator has completed final reclamation to the authorized Forest Service officer's satisfaction, the remaining bond amount is returned to the operator.

16. Please provide the number of environmental impact statements and environmental assessments done for mining operations on national forest lands for the past 10 years.

A. Over the past 10 years, the Forest Service has completed 13 Environmental Impact Statements (EIS) on locatable mineral operations and currently has another 13 EIS's in progress. Our records on the number of Environmental Assessments (EA) completed over the past 10 years are not as accurate as for EIS's. However, we estimate that the Forest Service has completed approximately 20,000 EA's for locatable mineral operations over the past 10 years and that another 3,500 EA's will be completed this year.

17. Please provide examples of how mining operations in sensitive areas are dealt with absent withdrawal from mineral entry, for example: endangered and threatened species habitat, archeological areas, riparian zones, areas of critical environmental concern, etc.

A. When an operator/claimant proposes a mining operation in a sensitive area, the Forest Service evaluates the proposal to determine what effects the proposed operation will have on the environment. Field surveys are conducted to evaluate wildlife habitat, threatened and endangered (T&E) species, archeological sites, fisheries, water and air quality, and visuals. An EA or EIS is prepared which evaluates the proposal and its effects on the environment. Measures are developed to mitigate the surface impacts. Some examples are:

(1) Amax's Henderson open pit molybdenum mine in Colorado. The mine is located in a cirque basin; and, due to environmental concerns, the mill was located on the other side of a mountain adjacent to the mine. Because of the visual sensitivity of the area and other environmental concerns, the company put in a 12-mile access tunnel through the mountain for hauling ore from the mine to the mill instead of building a surface haul road.

(2) Quartz Hill molybdenum mine in Alaska. The mine proposal is for an open pit mine with an in-pit crusher. The mill will be located approximately 4 miles from the pit. This is due to the sensitive nature

of the surface, the fact that the mine is within a National Monument and the area around the mine is not adequate for a mill. The Company will be constructing a 3.6-mile conveyor tunnel instead of a surface haul road to move the crushed ore from the pit to the mill.

(3) Asarco's exploration drill project in the Cabinet Mountain Wilderness, Montana. The project was a helicopter support drill operation in which a portable core drill was flown in by helicopter and set up on a preconstructed wood drill pads. The only surface disturbance was from the drill holes which were plugged and covered with rock upon completion. There were other seasonal, visual, and wildlife constraints put on the operations to further minimize environmental impacts.

(4) Uranium exploration in Sunlight Basin, Colorado. Exploration activities were not allowed during the elk calving season.

(5) Freeport McMorran Gold Jerritt Canyon Mine/Mill, Nevada. This operation is an open pit mine with floatation mill and cyanide heap leach circuit. Access to the mine crosses a stream that contains a T&E species, Lahonton cutthroat trout. To mitigate the impact to the fishery habitat, the company put in a large culvert (10'-12' diameter) and restored the fish habitat to that which existed prior to construction.

(6) Amax Exploration, Quartz Creek, Colorado. The Company submitted a proposal to conduct exploration (drill) in a proposed wilderness. Due to the high environmental sensitivity of the area, the Company, instead of building a network of exploration roads, utilized a bulldozer to drag in and maneuver the drill to and from the drill sites. Little surface disturbance took place; disturbed areas were reclaimed.

(7) Numerous exploration projects throughout the West utilized track-mounted drills instead of using truck-mounted drills and building roads. Using track-mounted drills creates little impact on the environment, and they are cost effective as compared to track-mounted drills and road construction.

18. Please provide the number of land and resource management plans and the status of such plans for national forest lands.

A A total of 123 Land and Resource Management Plans will be completed for the National Forests. As of June 20, 95 finals and 27 draft Forest Plans had been prepared.

19. Please provide the process used by the Forest Service to amend or revise land and resource management plans, including the time frames for amendment or revision.

A. National Forest Management Act requires forest supervisors to review conditions on the land at least every 5 years. A forest plan is ordinarily revised on a 10-year cycle but must be revised at least every 15 years. It may also be revised or amended whenever the Forest Supervisor determines that conditions have significantly changed in the area covered by the plan. In addition, the monitoring and evaluation process may trigger a plan revision or amendment.

A Forest Plan revision must follow the procedure for the development and approval of a forest plan outlined below.

File Notice of Intent to prepare an Environmental Impact Statement (EIS)	45 days
Prepare Draft Environmental Impact Statement (DEIS)	time not subject to regulation
Issue DEIS for comment	90 days minimum
Prepare Final Environmental Impact Statement (FEIS)	time not subject to regulation
Issue FEIS and Record of Decision	time not subject to regulation
Implementation of FEIS and Record of Decision	45 days from date of decision

If the change resulting from the amendment is not significant, the Forest Supervisor may implement the amendment following appropriate public notification and satisfactory completion of the NEPA requirements, usually an Environmental Assessment. There are no time frames that, by regulation, must be adhered to as in the preparation of an EIS.

20. To what extent are minerals and mining activity currently considered in land and resource management plans? Please provide examples of how minerals and mining activity currently are considered in such plans.

A. A minerals resource inventory is usually prepared to assist the planning team in formulating management prescriptions for the Forest. If a highly mineralized area is known, the management prescription reflects that information, including development of a "mineral management prescription" in some cases. Site-specific projects are rarely addressed in a plan, mainly because the when, how, where, and if, of possible future exploration and discoveries are not known.

Some examples of recognizing known mineralized areas (in some cases of national significance) are: the Custer Forest Plan and the Shoshone Forest Plan.

The Helena Forest Plan is an example of where a minerals report (Lynn Dickman report) led to design of forestwide and management area standards and guidelines.

21. Do you believe that it's important for the Forest Service to have decision-making authority over mining activities on National Forest lands?

A. The Forest Service should continue to have the authority to manage the surface resources of the National Forest System. The Forest Service and the BLM have established an effective approach to coordinating Mining Law activities under the current Memorandum of Understanding.

22. Would anything prevent the Forest Service from administering mining claim and patent records on Forest Service lands?

A. Current law places this responsibility with the Secretary of the Interior.

23. Do you currently keep records of other permitted activities on national forest lands, such as grazing allotments, and recreational permits? Please describe such records.

A. Yes. Permitted activities authorized by special-use authorizations are recorded in a computerized record maintained at the Forest level called FLUR. The name of the permittee, type of use, location, fee charged, and other facts are kept on each authorization. In addition, the location and basic information of long-term uses are recorded on the land ownership status system.

24. How should the confusion over what constitutes a "valid discovery" be resolved?

A. From our viewpoint, we believe the only confusion over a "valid discovery" under the 1872 Mining Law relates to uncommon varieties of mineral materials as noted in our response to Senator Bingaman's Question 1. Aside from that, the current standard for determining a "valid discovery" (referred to as the "prudent person test" and the "marketability test") is adequate. This standard has been developed over more than a century of decisions by the Department of the Interior and the courts.

25. How should a royalty on mineral production be structured and administered?

A. If a royalty on locatable mineral production system were to be implemented, it should be based on some form of net revenues, so as not to unreasonably impact the domestic minerals industry. It should be administered by a separate royalty management agency.

26. How would you define a "small miner"?

- To what extent does the "small miner" contribute to the development of minerals on federal lands?

- To what extent does the "small miner" engage in speculation, unnecessarily tie up of federal lands, and increase the cost of mining?

A. While there is no formal definition, we generally think of a "small miner" as one who employs fewer than 20 people and has a capitalization of less than $1 million. These individuals conduct much of the basic prospecting and exploration today as they have historically. Because "small miners" have a low capital position, they seldom operate a producing mine unless it is a small-scale mine that requires little capitalization and a small workforce. Most often, the "small miner" finds attractive prospects and then submits them to medium and large "majors" (mining companies who do the development work and put the properties into production).

During the exploration phase, it is common practice (for all sizes of mining firms) to locate a large block of claims over and around an area where it is suspected that deposits of valuable minerals may occur in order to assure that the specific exploration target is within the claim block. Once an orebody is outlined with the required degree of accuracy, some of the surrounding "speculation" claims are dropped and detailed exploration and developmental work is concentrated on the mining claims that contain the orebody. The practice of locating large blocks of mining claims during the initial exploration phase is not considered to unnecessarily tie up Federal land or to increase the cost of mining.

SENATOR McCLURE'S--QUESTIONS
HEARING ON THE MINING LAW OF 1872
June 7, 1989

MR. GEORGE LEONARD
U.S. FOREST SERVICE

1. Does the Forest Service have sufficient authority to manage surface use in relationship to Mining Law activities?

A. Yes. Under authority of our locatable mineral regulations (36 CFR 228, Subpart A) and other laws and regulations administered by this or other Federal and State agencies, we have sufficient authority to manage surface use activities related solely to the Mining Law.

2. After patenting, what authority is available to the Forest Service to handle mining activities?

A. A distinction must be drawn between our ability to control use of the patented land itself and our ability to regulate activities which the patent holder proposes to conduct on National Forest System lands which may partially or completely surround the patented land.

Strictly speaking, Federal agencies do not have direct control over what takes place on patented claims. These lands are just like any other private land for which the owner holds title in fee simple absolute. The only Federal restrictions on the use of patented claims are indirect. The patent holder is subject to applicable Federal laws including: the Clean Water Act, the Clean Air Act, and the Endangered Species Act. Also, if the activities taking place on the patented land result in a trespass on National Forest System land or damage to National Forest System land, the Government may institute litigation to enjoin such impacts and to recover damages.

The extent of the control that the Forest Service has on the patent holder's use of National Forest System lands outside the patented land depends on whether that use is access-related. If the use is not access-related, the patent holder cannot use Federal lands outside the patented area unless that use is: (1) within the authority of a Federal agency to permit; and (2) authorized by the Federal agency subject to such conditions specified by the agency as long as those conditions are not arbitrary, capricious or an abuse of the agency's discretion.

If the use is access-related, the patent holder may have a right to use National Forest System lands for reasonable access facilities. However, that right is dependent upon whether the patent holder lacks access to his property through other lands. For example, under the Wilderness Act, the holder of a patent has a statutory right of access over National Forest System lands only if the patented land is "completely surrounded by national forest lands within areas designated" as wilderness (16 U.S.C. 1134(a)). Similarly, in the proposed Forest Service rules implementing Sec. 1323(a) of the Alaska National Interest Lands Conservation Act

(ANILCA)(16 U.S.C. 3210), the position taken was that "if the landowner already has access to his land, the Forest Service is under no obligation to provide other access routes." (53 F.R. 37795 (September 28, 1988)).

Moreover, if a patent holder has an right of access over National Forest System lands under either ANILCA or the Wilderness Act, the patent holder may not build whatever access facilities the holder might desire. Under ANILCA the access that is guaranteed is that which "the Secretary [of Agriculture] deems adequate to secure to the owner the reasonable use and enjoyment of . . . non-Federally owned lands within the National Forest System." (16 U.S.C. 3210). Similarly, under the Wilderness Act, the access guaranteed is that which is "consistent with the preservation of the area as wilderness, [and] permit[s] ingress and egress to such surrounded areas by means which have been or are being customarily enjoyed with respect to other such areas similarly situated." (16 U.S.C. 1134(b)).

Thus, under either statute, if the patented lands are completely surrounded by National Forest System land, the Forest Service has the authority to refuse to allow a patent holder to build the type of access facilities that would be required for a major recreation complex on the patented land. However, as the scale of the access facilities that the holder of patented land seeks to build decreases, at some point the Forest Service's refusal to allow the construction of those facilities would constitute a taking of the patent holder's property rights for which the Government would have to pay just compensation. The point at which the denial of an access proposal constitutes a taking is an area of law that is essentially undeveloped. Further, whether the denial would constitute a taking also would depend upon facts such as the patent holder's proposal, the character of the land, and uses customarily made of similarly situated land.

MINERAL POLICY CENTER

• 1325 MASSACHUSETTS AVENUE NW #550 • WASHINGTON, DC • 20005 • 202-737-1872 •

23 June 1989

Honorable Jeff Bingaman, Chairman
Subcommittee on Mineral Resources
Development and Production
Dirksen SDOB
United States Senate
Washington, D.C. 20510

Dear Senator Bingaman:

Thank you for your letter of 14th June to Stewart Udall, requesting the Mineral Policy Center's ("MPC's") response to additional questions for the record relating to the Subcommittee's June 7th hearing on the Mining Law of 1872 and on S.1126, the "Mining Law of 1989." We appreciated the invitation. Stewart Udall and I have discussed your questions, and I submit the following response for us both. Some additional information based on discussion during the hearing is also enclosed. Taking your questions in order:

1. "What do you think the most critical challenges are for federal land managers in the reclamation area and in terms of environmental protection and mitigation during the life of a mining operation?"

Mining management problems can be classified in four groups: decision where to approve mining, prevention/minimization of impacts during mining, closure and reclamation, and enforcement. All four are critical, and must be addressed at large and small mining sites, whether surface or underground.

Approval Decisions:

The first question for Federal land managers must be to determine the best use of a tract of the public domain - whether it be as a mine site, as Wilderness or wildlife habitat, or as watershed or viewshed. These decisions must be made in the context of the land-management planning process created by FLPMA and NFMA, and not dictated by geologic accident alone. The decision whether mining should be permitted at a site is the single most important factor in environmental protection; causes for this are given under question 8.

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The determination that mining is the best use of land should be based on a detailed site-specific evaluation which takes the individual character of a proposed mine site into full account. When mining is approved, the approval decision should contain extensive detailed requirements for performance, not general prescriptions and admonitions. Federal mining decisions should be assisted with generous public involvement.

Impacts During Mining:

Once a mine is opened, disposal of waste and tailings in a safe and permanent manner which prevents water pollution is the major concern during its operating life. Mining generates twice as much hazardous waste annually as all other U.S. industry and municipal landfills combined (EPA Report to Congress on Mining Waste, 1985). In the past we have depended on geographic isolation to protect human health from the effects of this waste, but that has not worked in the past and will be less successful in the future as mining and population spread.

"Because of its prolonged development, adverse environmental impact, and its persistence over many decades, AMD [acid mine drainage] ~~is~~ considered to be the most severe of the potential problems posed to the environment or to public health by mining wastes." (Mining Waste Study / Final Report, University of California at Berkeley, July 1, 1988, p.22) In my discussions with many state mining regulators from different regions, they have stated that California's conclusion, that acid mine drainage is the worst mining waste problem, is true for their states as well.

Steps to prevent generation of acid drainage from mine sites are crucial, and must be taken while the mines are in operation. Once acid generation is developed in mine waste piles, it is difficult or impossible to manage. See the enclosed paper, "Long Term Prevention of Acid Mine Drainage," for more discussion.

Tailings, the fine ground rock left after metals are removed from mined ore, can leach heavy-metal contamination into ground and surface waters; often, tailings carry cyanide or other toxic processing chemicals onto the landscape and into groundwater. Sloppy structural design of earthen dams containing tailings has resulted in catastrophic dam collapses. Tailings are often drained to the lowest point on the landscape, in natural canyons or draws, which creates the greatest danger of groundwater contamination or erosion of tailings into streams.

At the McLaughlin Mine run by Homestake Mining in California, tailings are neutralized and pumped to a high location, isolated from groundwater and not in the path of streams. This greatly reduces the risk of future water contamination. This good practice is sadly rare, but should be required in many sites.

Some other mining problems which require attention include (i) wildlife poisonings from cyanide ponds, which should be easily solvable with responsible care by the Federal enforcement agencies and the miners; (ii) flushing of cyanide residues from large heap-leach piles to prevent subsequent problems, which is a treacherous potential problem and needs more care and research; (iii) exclusions from regulation for "small miners" by the BLM, which has led to unequal enforcement and abuses.

Closure and Reclamation:

Mining inevitably converts a natural landscape to a man-made one, and modern open-pit surface mining does this on a vast scale. The post-mining landscape may mimic a natural one, or it may retain its raw industrial edges, but it is nonetheless in truth man-made.

The Surface Mining Control and Reclamation Act requires restoration to "approximate original contour" after mining for coal. In most cases, we believe that "approximate original contour" should be the objective for reclamation of hardrock mining sites, as well. This should be an unavoidable requirement for exploration roads, small excavations and drillpads graded for sampling and assay projects, and small mining operations. However, a variance from "approximate original" may be justified in the case of very large open-pit excavations. Each movement of the mined material exacts a price in energy, in dust and disruption, and in exposure of new material to possible acid-drainage-forming bacteria. Excavating a large open-pit mine requires moving the material once; moving it all again to re-fill the pit may not be desirable.

The legislative wording for this will have to be very carefully crafted. There is a serious danger that once **any** excavations are permitted to avoid "approximate original contour" restoration, most or all will avoid it.

Topsoil restoration, planting with appropriate vegetative cover, and post-closure monitoring and management of groundwater and drainage must all be strictly required.

Enforcement:

Ensuring that planned environmental protection and reclamation is actually carried out is a persistent problem in mining administration (see "Interior Should Ensure Against Abuses From Hardrock Mining," GAO-RCED-86-48); steps must be taken to ensure that enforcement is thorough, effective, and timely. Legislation should be enacted to require that full bonding or other financial security be posted at all times to cover cleanup and reclamation costs.

As recommended in our testimony, citizens and private organizations should be granted standing to enforce requirements of mining permits and the law; this provides vitally-needed insurance for the public interest where agencies become lax. Citizens bringing successful enforcement suits where agencies failed to enforce the law should be entitled to recover costs and a portion of fines.

2. "Should we consider using some of the fees generated by this bill to fund an abandoned mine reclamation fund for hardrock mines?"

As stated in our testimony, the Mineral Policy Center believes that an abandoned mine reclamation fund for hardrock mines is badly needed. Such a fund would serve much the same role which the Abandoned Mine Land Fund established by the Surface Mining Control and Reclamation Act of 1977 plays for coal mining.

The purpose of the hardrock AML fund would be to repair environmental damage which has resulted from past mining, and to serve as a reclamation source for new mining where the parties responsible for reclamation default. GAO has reported (RCED 88-123BR) that about $2.9 million has been spent for hardrock mine site reclamation since 1974. Over two-thirds of this has come from converted coal AML funds.

In MPC's view, solution of the abandoned mines problem requires that all forms of mining share equitably in the overall costs of reclaiming their impacts. At present, coal mining is taxed for the purpose of reclaiming coal and -to a very limited extent- hardrock sites. One could establish a unified reclamation program for all mining, and levy a contribution to a unified AML fund from each industry segment. This would have some advantages. However, since the coal SMCRA program is in place and since the magnitude of the coal problem is substantially greater (GAO), developing a self-contained hardrock program may be the simplest cure.

We recommend that this hardrock AML program be funded with half of the revenue from hardrock mining royalties, up to a maximum $50 million/year level. This is based on our estimate that the total cost of hardrock reclamation will be at least $550 million, and provides for a solid beginning on that task.

3. "Do you generally agree with the General Accounting Office's figure of $284 million as the total cost to reclaim 281,581 acres of disturbed federal land?"

MPC believes that the GAO estimate is substantially too low, though it provides an important and useful starting point for evaluation. Our position is based on direct field experience and an estimate of the probable effect of errors in GAO's methodology. We believe that doubling GAO's figures gives a much better estimate of the true cost to be expected for reclamation.

We have discussed this view with the GAO investigators who authored "An Assessment of Hardrock Mining Damage," (GAO/RCED-88-123BR) ("the Assessment"). They agree that their study limited itself to a part of the whole reclamation problem, and that the real total could be double, or more than double, the amount reported in the Assessment.

First, GAO sampled a statistical base developed from BLM records of mining claims active from 1976 through 1986 to develop the Assessment. GAO states "Because we did not sample from the entire universe of quarter sections on which mining has ever occurred, our projections may understate the total amount of unreclaimed federal land disturbed by hardrock mining."(p.19)

Second, GAO's sampling method is statistically valid only if mining impacts are randomly distributed over the sample base. However, mining often occurs in intensely-worked districts, not as randomly-distributed unrelated sites. Only a more extensive study could determine whether this effect substantially alters the total, but from field experience we believe it very probable that it does.

Third, the sites discussed in GAO's reports of March, 1986, October, 1987, and April, 1988, include only relatively superficial surface and physical disturbance, not stream contamination and acid-drainage sites. No sites causing major groundwater contamination are included. No sites are included which involve major tailings deposits which are eroding or causing surface or groundwater contamination. Yet it is well-established that these sites are numerous. See, for example, "An Evaluation of Mining Related Metals Pollution in Colorado Streams," Colorado School of Mines, 1987. The costs of reclaiming these mining-caused water-contamination sites will typically be much greater than the average of $1,000 per acre shown in GAO's report.

In fact, the cost of reclaiming some **single** mining sites to end their threat to the environment will exceed GAO's estimate for the nation. The Clarks Fork - Silver Bow CERCLA mining waste site in Montana is estimated to cost several hundred million dollars to reclaim to end water pollution (American Mining Congress seminar, September, 1988). Whenever material must be moved, as when hazardous tailings must be removed from streambeds, costs will be much higher than for mere regrading of surface excavations. Some of these contaminating sites qualify for cleanup under Superfund, but many do not and their costs will greatly overrun GAO's total.

Furthermore, no placer dredged areas appear to be included in GAO's totals. These are typically large in extent. This form of mining has not been very significant in the 1976-86 period, though it has been extensive and very environmentally-destructive in the past, so it may be under-represented in GAO's sample. Past placer dredging practice removes all topsoil and fine soil material from the dredged area, leaving only windrows of barren gravel; restoring these areas would require importing topsoil, often for significant distances, at high cost.

Finally, the GAO did not include acreage or cost for reclaiming areas which are being mined at the time their Assessment was prepared. This is 142,468 acres, or half as much as is included in the predicted total for abandoned lands (Assessment, p.9). Because BLM does not require bonding for reclamation costs, and because the Forest Service by its own admission (House hearing, April 18, 1989) has set bonds at inadequate levels, the public has no guarantee that much of this 142,468 acres will ever be reclaimed.

Sen.Bingaman•23Jun89•7:

4. "Please provide information on the effects of using cyanide in heap leaching operations."

The cyanide ion, or CN^-, is able to react with gold to form a soluble compound. The reaction is

$$4Au + 8NaCN + O_2 + 2H_2O \longrightarrow 4NaAu(CN)_2 + 4NaOH$$

and related similar reactions. (U.S. Bureau of Mines IC 8969). Thus, cyanide permits the small percentage of gold to be removed from a very large mass of rocky ore as a solution. The same reaction works for silver, and in the discussion which follows gold is used to refer to both metals.

In the heap-leaching process, low-grade gold ore is piled in "heaps" on the ground. The heaps are placed over a prepared liner which is intended to be impermeable. Heaps are typically built up in layers, or "lifts" of twenty feet of height at a time. A heap can cover from a few to fifty or more acres. Each lift is leached by applying cyanide solution by irrigation pipes to its top; the solution percolates down through the ore, saturating it and reacting with the gold to form a soluble compound which flows out of the bottom of the heap. until most of the gold is removed. Then another lift of ore is applied and the process is repeated. Usual practice is to stack lifts to a maximum height of about 150 feet.

Cyanide as used in heap-leach gold extraction causes effects which fall into four groups: immediate mortality, groundwater contamination, enduring residues, and shipping hazards. Most of these effects **can** be controlled and reduced to acceptable levels, with proper management. However, current management practices are often inadequate to prevent unacceptable environmental results.

The Committee should recognize that the use of cyanide in gold ore treatment is not limited to heap-leach systems. Massive amounts of cyanide are used in vat-leach ore processing, in which a thick slurry of finely-ground gold ore is contacted with cyanide solution which is much more concentrated than the solution used in heap-leaching. After the precious metal is removed from the ore by reaction with the cyanide, the spent ore powder is separated from the gold-bearing solution and the powder is flushed from the plant as a slurry. This slurry is disposed in a "tailings pond." These ponds cover up to hundreds of acres. Because the cyanide solution which had been used to treat the ore is highly concentrated, the tailings carry residual cyanide. This material can cause either direct waterfowl poisonings, or groundwater contamination through migration of the cyanide (and other heavy-metal contaminants) over time.

Vat-leaching is more efficient at removing precious metals from raw ore than heap-leaching. A typical vat-leach operation will extract over 95% of the metal from ore, whereas heap-leaching is regarded as successful if an 80% extraction rate is achieved. However, heap-leaching is much cheaper per ton of ore, so lower-grade ore can be economically heap-leached which could not be vat-leached at a profit. Many mines use both methods in combination, trucking the higher-grade ore to a mill for grinding to powder and vat-leaching, while the lower-grade is trucked directly to heaps.

The most notorious environmental problem arising from heap-leach mining has been the killing of thousands of migratory waterfowl which alight in solution ponds in arid locations. See the enclosed newspaper report, "Miners try to evict birds from cyanide ponds," from the Reno Gazette-Journal, of 2 April 1989. The House Subcommittee on Water and Power Resources has expressed concern to the Interior Department over this issue. In MPC's view, this is an issue of enforcement, not of technology.

Groundwater contamination problems can arise from either heap- or vat-leaching. In heap-leaching, leaks in the liner membrane, leaks in piping, or simple operator error leaving valves open can all cause cyanide spills onto the ground. While cyanide breaks down readily in air, it has been shown to be stable in subterranean environments for long periods. See the Zortman-Landusky site discussion in the enclosed "Results of Mining Waste Site Reviews," U.S. Environmental Protection Agency, April, 1986.

A copy of the National Park Service "Manual for Reviewing Proposed Cyanide Leaching Projects," is enclosed; while MPC does not believe the Park Service has set standards which are adequate for environmental protection from cyanide mining, it is a very useful and informative document.

5. "The validity of the March 1989 General Accounting Office report of the Mining Law has been questioned. Are the examples of the federal government

selling lands for $2.50 or $5.00 per acre that later bring much higher prices unusual?"

The Mineral Policy Center does not have direct real-estate information to corroborate or challenge the GAO's findings. However, we would observe in general that the minimum price per acre for Western land in many areas is $500 or more, and prices of $15,000 per acre are -if not usual- not unique. No private land in the west is sold for $2.50 or $5.00 per acre, and none has been since, possibly, the Great Depression.

Clearly, the acreage values charged for patenting title pursuant to the 1872 Mining Law bear no relationship to the fair market value of the land today. Whether the specific cases cited in the GAO report, "The Mining Law of 1872 Needs Revision," are common or not, the fact remains that the patenting provision invites exploitation and serves no public purpose today.

Furthermore, as noted in our testimony, 2016 unpatented claims exist in units of the National Park System, and thousands more in sensitive areas of National Forests and Wilderness Areas. In many of these cases, remote homesites on the patented claims could bring prices far beyond $15,000 per acre, and could bring irreparable cost to our national wild heritage.

5, continued: "Do you agree with the conclusions of the report? On what grounds?"

The Mineral Policy Center believes that the conclusions of the report are sound. We believe, with GAO, that the government should retain title to public lands and to public minerals, while permitting private parties to obtain permission to remove those minerals in return for a fair royalty.

S.1126 provides for this to take place, through its provision for a patent permitting mining. We believe, as stated in our testimony, that the provisions for rescission of that patent where actual mining is not taking place need to be tightened. The concept of S.1126 in this regard is important and urgently needed.

6. "Does the 1872 Mining Law give mining a disproportionate role on the public lands?"

Because the 1872 Mining Law grants a right to mine wherever a "valuable mineral deposit" is found on open public lands, mining pre-empts the thoughtful balancing of different uses and resources which the planning provisions of the Federal Land Policy and Management Act and the National Forest Management Act were intended to ensure.

For example, the draft Environmental Impact Statement prepared by BLM for the Guadalupe Mountain Tailings Disposal Facility states:

> "In most EISs, the lead agency is required to consider and assess alternatives to a proposed action, i.e., No Action, alternate locations, and alternate methods of accomplishing the objectives of the proposed action. However, in the case of an action authorized under the mining laws, the BLM can only assess the impacts resulting from the proposed action... Consequently, this EIS will not address alternatives." (dEIS, December, 1988, p.1-16)

BLM also notes in the same document, "If the millsite claims were patented, the BLM would have no enforcement authority...." The threat that mine lands will be patented and removed from their jurisdiction altogether makes Federal managers unduly deferential to mining companies.

At another mining location, the "Castle Mountain Project" in San Bernardino County, California, the draft EIS prepared for BLM says:

> "Consideration of the No Action Alternative is required by both NEPA and CEQA. However, because mining operations are authorized on Federal lands, this alternative could only be implemented if the proposed action were to result in "unnecessary or undue degradation."

We are not aware of any mining operation which BLM has ever refused permission based on the operation's possible "degradation," and even if BLM were to do so the option of patenting and evading Federal oversight altogether remains.

Thus the 1872 Mining Law gives mining an "override" above all other regulation and planning on the public domain, unique among public resources. It is unfair, a frustration to public land managers, and a contradiction to the spirit of modern land management.

7. "What do you see as some of the advantages of my bill, as opposed to a leasing system?"

Despite its advantages over the 1872 Mining Law, a leasing system would tie up the land and dampen entrepreneurship and individual initiative. Those traits and that freedom have a philosophical importance to America beyond their objective resource return. The populist basis of the old 1872 Mining Law should and can be preserved while meeting modern multiple-use resource management and environmental goals.

A system such as is proposed in S.1126 would retain most of the self-initiation and freedom of the current location-patent system, while subjecting those traits to a public-interest evaluation before a land area and its environment are committed to mining. Such a land-manager's evaluation and decision must be a part of any reformed Mining Law. Simply eliminating nominal patenting, while granting effective land-ownership to any discoverer, will not suffice.

S. 1126 will have the added advantage that it will avoid the problems we now have with Federal onshore oil leasing, of granting a qualified property interest before the impact of developing of that interest is known. Issuing a lease grants a right, subject to varying limits, to remove the leased mineral, and therefore implies that the environmental cost of developing the lease must be considered before the lease is issued. See Sierra v. Peterson, 717 F.2d 1409, (D.C.Cir., 1983). By permitting initial exploration through "self-initiation," rather than by issuing a lease, S.1126 does not obligate the Federal government to approval of subsequent development proposals.

The concept of S.1126 does expose a miner to a risk that his patent could be denied after development expenditures. In practice the mining industry already evaluates the environmental risks of a site before spending a lot on drilling and assaying it, to reduce their risk.

8. "You state in your testimony that some mining sites cannot be reclaimed, no matter how hard the miner tries. What causes this? What should the remedy be?"

The Environmental Protection Agency's April, 1986 study of twelve existing mining waste sites (enclosed) states "In many cases it will be very difficult and expensive, **if it is feasible at all**, to eliminate or reduce ongoing releases at older [mining] sites or to mitigate past damages."(emphasis added). In its December, 1985, Report to Congress on mining wastes, the EPA states "Site selection for the mine... is the single most important aspect of environmental protection in the mining industry." (p.ES-18)

The process of acid drainage, once set into motion by mining and disturbance of pyritic materials, is difficult or impossible to halt. For example, many years' repeated reclamation efforts at the Fisher Creek mining site near Yellowstone have been unsuccessful, due to acidity and the difficult growing climate of the area. No vegetation has been established, and acid flow continues to pollute several stream drainages.

Metals contamination of waters occurs both independently and particularly in combination with acid generation (which accelerates the uptake of metals into solution). This can result in toxification of waters - extremely expensive and difficult to reverse once begun.

Groundwater contamination at the Picher Field in Oklahoma and Kansas is discussed in the enclosed EPA "Results of Mining Waste Site Reviews." Resulting contamination of the Roubidoux Aquifer has been named as the worst pollution threat in Oklahoma. Now that the acidification process has begun, with ensuing metals contamination, halting it may be impossible.

Problems of tailings disposal and erosion have been mentioned under Question One. Mining sites in narrow mountain canyons may have no place where tailings can be placed, other than in the streambed at the canyon floor.

Advancing technology and a willingness to spend more on protection may make it possible to safely mine some sensitive sites. In other cases, the only prudent course is to decide not to permit mining in the first place.

Reform of Federal mining should require that a proposal for mining include cradle-to-grave planning for prevention of acid generation or any other contamination problems in mine waste, heap-leach materials, tailings, and any other disturbed areas. The plan should determine how the mined area will be stabilized and managed after mine closure. It should require that the closed mine be designed to be proof against contamination from tailings erosion, groundwater leakage, etc - and that required maintenance be endowed or guaranteed by bonding.

If these conditions cannot be met, the reformed Federal law should direct that mining not be approved.

9. "My bill would set up roughly the same kind of dual administrative roles between the Forest Service and the Department of the Interior as we now have for oil and gas. You have commented that you think that could be improved; please elaborate."

Integration of the management of the various resources found on the public lands is the goal of the Federal Land Policy and Management Act of 1976 and of the National Forest Management Act. This integration requires that mineral management be done in concert with that of other resources.

To achieve full integration, each land-management agency needs to have equal control over each of the resources on its lands. Similarly, the economic incentives for each resource should be collected within the applicable land-management agency. The Political Economy Research Center, of Bozeman, Montana, has argued that the fact that oil-lease revenues do not accrue to the Forest Service's accounts hampers fair management of oil resources on National Forest Lands ("Oil and Gas Exploration and Development in the Greater Yellowstone Ecosystem," John Baden et al., 1986).

The standard management tool of establishing accountability for decisions also requires each land-management agency to have autonomy over its mineral management decisions. The complicated structure which exists for onshore oil/gas leasing works against accountability. The Bureau of Land Management has the fundamental responsibility for lease issuance and management, subject only to "objection" and surface use plan approval by the Forest Service. In reality, when BLM establishes - as it has - a policy that all lands legally available should be leased, the Forest Service is under pressure to conform.

We recommend that the Forest Service hold claim records and administer exploration and mining permits and patenting procedures on National Forest lands. Revenues from royalties should be administered by the Minerals Management Service, for all Federal minerals, but the revenues should be credited to Forest Service accounts for National Forest mines.

The Interior and Agriculture departments should be directed to develop their regulations for the execution of the new Mining Law jointly, to obtain maximum consistency. However, the regulations should not be required to be identical.

Within the text of S.1126, we recommend that the term "Secretary" be generally defined in Section 102(15) as meaning "the Secretary of the Interior, or, for National Forest lands, the Secretary of Agriculture."

As written, S.1126 prescribes in Section 202(d)(2) that final decision on approval of exploration plans shall be made by the Secretary [of the Interior] on all lands (p.8, line 8), and the Secretary [of the Interior] has sole authority to require plan modifications. We see no reason to give DoI this superior authority on exploration plans on National Forests. S.1126 also prescribes (Section 202(d)(2), p.8, line 18) that the Secretary [of the Interior] determines the conditions of plans, "including conditions for the protection of the environment." Again, these powers should rest with the land-management agency.

Again, in Section 203(a), the Secretary [of the Interior] is given authority to establish patenting regulations, and at Section 203(c), the Secretary [of the Interior] determines the issuance of patents. Diligence determinations on National Forest lands are delegated to the Secretary [of the Interior] at Section 204(e)(2). Use of National Forest lands for mining use would be determined by the Secretary [of the Interior] under Section 205.

The system of bifurcated minerals administration which applies to onshore Federal oil and gas is the heritage of a time when minerals were regarded as the special province of the Interior Department, and the Forest Service was viewed as simply the steward of the stumps. That is no longer our national objective. Mineral development is a major activity on National Forests, and the administrative apparatus of the Forest Service is striving to catch up.

Mining Law reform can assist this process of integration by making the Forest Service fully empowered and fully responsible for hardrock mining on National Forests. We urge you to amend S.1126 to do this.

Concluding Comments:

The trend in mining is toward larger and larger mines extracting lower-grade ores. The disturbance mining causes to the environment will increase in the future, not diminish. Reform of the 1872 Mining Law to match the realities of today, and forget the small-miner fantasies of a century ago, is urgently needed. Bringing mining into the normal sphere of public resource management will be healthy and beneficial for the minerals industry, as well as for the environment, in the long run.

Thank you for this opportunity to supplement our testimony. We applaud the Subcommittee for this excellent beginning at the task of reform of the 1872 Mining Law, and we urge you to persevere.

Sincerely,

Philip M. Hocker,
President

cc: Hon. Stewart L. Udall
Hon. Dale Bumpers

Enclosures:
- "Long Term Prevention of Acid Mine Drainage," Dr. A. MacG. Robertson, P.Eng, Vancouver, B.C., 20pp.;
- "Miners try to evict birds from cyanide ponds," Reno Gazette-Journal, 2 April 1989;
- "Manual for Reviewing Proposed Cyanide Leaching Projects," National Park Service, 1987;
- "Results of Mining Waste Site Reviews," U.S. Environmental Protection Agency, April, 1986, 43pp;

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EDUCATIONAL MATERIAL FROM
MINERAL POLICY CENTER
1325 MASSACHUSETTS AVE. NW, [illegible]
WASHINGTON, D.C. 20005

April 8, 1986

MEMORANDUM

TO: Cliff Rothenstein, OSW/EAB

FROM: Rod Lorang

SUBJECT: RESULTS OF MINING WASTE SITE REVIEWS

Enclosed is draft material summarizing the results of our review of twelve mining waste sites. These sites were selected from a much larger set of sites based on expected relevance to current mine waste management practices, or to questions related to constituent transport. We also sought cases where problems existed, and excluded cases where good waste management practices or benign conditions had prevented health risk or environmental degradation.

We are providing separate descriptions for each site, and a short paper that briefly explores the case for some RCRA regulation on the basis of observations at these sites. This short integrating paper is an exercise in organizing evidence rather than a serious attempt to determine whether or how EPA should regulate: Other analysis that you are conducting or plan to conduct is very relevant to this question, as is your ongoing work on existing state and Federal regulatory programs.

You indicated at the beginning of this work that you wanted a useful narrative on sites from this work, not simply tables summarizing conditions or characteristics at a group of sites. Therefore, we have focused our efforts on the development of short descriptions of each site, organized as follows:

- Background
- Problem decription
- Clean-up history, status and plans
- Current concerns
- Potential implications for RCRA.

and buried. Tailings from silver, lead, and zinc mining were also used to level home sites at Smuggler Mountain. Air and direct contact risks persist at the site.

Releases to surface water are common among the twelve sites. Some of these releases occurred as a result of equipment or containment failures, usually in connection with storm events. Sudden system failures were responsible for releases at Bunker Hill, Zortman-Landusky, Copper Cliffs, Cyprus-Bagdad, and possibly Poor Boy Claims. There have also been ongoing releases resulting from systems failures at the Iron Mountain and Anaconda/Silver Bow Creek sites. At several of these sites, releases occured in the late 1970's or 1980 despite active management efforts. Sudden releases have had adverse environmental consequences, and have made domestic supply water unsuitable for drinking on a temporary basis.

Other releases to surface water have been more gradual, as a result of leaching from waste piles, or mine drainage. These releases have had more adverse environmental consequences. Leaching from waste piles has contaminated local surface water at McLaren, Anaconda/Silver Bow Creek, Bunker Hill, and Iron Mountain. Drainage problems associated with poor closures and an absence of post closure care are factors at Iron Mountain, Picher Field, and Eagle mine and mill. A large number of additional sites where these kinds of releases occur could also have been included in this study. A typical consequence of these continuing releases is destruction of in-stream ecosystems. Releases at Iron Mountain have also driven cadmium levels in the Sacramento level to near drinking water standards at the intakes for Redding's water supply.

Finally, ground water has been contaminated at Picher Field, Zortman-Landusky, McLaren, Anaconda, Iron Mountain, Smuggler Mountain, Bunker Hill, and Eagle mine and mill. At Picher field, public water supply wells have been affected, and a major drinking water aquifer is at significant risk. At Anaconda/Silver Bow Creek, wells have been closed, and contamination is so severe in one area that an alternate water supply 60 miles away has been put to use. Wells are also potentially threatened at other sites. Monitoring shows that heavy metals have been mobilized in acidic ground water at Picher Field, Anaconda, Bunker Hill, and Eagle mine and mill.

PATTERNS SUSCEPTIBLE TO REGULATION

These twelve cases suggest four areas in which additional regulation (or better enforcement of existing regulations) could be useful.

First, it is clear that proper management of tailings disposal could greatly decrease risk to human health and environment. The placement and control of tailings significantly affects contaminant releases. Improved tailings disposal would include construction of diversion ditches and placement in locations that would limit run-on. These measures would dramatically decrease run-off and leaching from tailings.

Second, improved design of leaching and tailings containment systems would reduce the risks associated with systems failures. Sudden releases from these facilities have been a problem that can be controlled. Measures taken in response to releases at Zortman-Landusky and Cyprus-Bagdad appear to have significantly reduced the risk of releases from equipment failures and storm events. More advanced and careful system design would have prevented sudden releases at four sites.

Third, these sites point to the need for better controls on the post-closure use of mine sites and tailings. Restricting the use of certain mine sites and building on or with tailings would significantly reduce health risks. This seems apparent from the sites we have covered even though we did not address uranium or phosphorus sites in this work.

Fourth, several of these sites suggest that there may be considerable value to simple closure and post closure care measures. Run-on control could have greatly reduced acid mine drainage problems at Picher Field . Liming of tailing piles at Anaconda is reducing the acidity of leach water, and therefore reducing metals content. Treatment of mine drainage water at Iron Mountain was found to be economic, and greatly reduces metals concentrations in downstream waters. Finally, discontinuation of mine pumping and treatment at Eagle mine in 1984 will probably lead to more serious drinking water contamination problems in the future than already exist at that site.

TENTATIVE CONCLUSIONS

It is clear that the potential for harm from mining waste disposal is sufficiently great to warrant effective controls. It is also clear that such control was often lacking in the past. It is not yet clear where the gaps in current regulatory programs may be, but some gaps appear to exist.

There appear to be significant opportunities for regulations that address particular problems on an industry wide or industry segment basis. Adequate closure and post closure care, for example, are needed at all sites. However, it is also clear that mine waste sites are highly variable, and that regulation must provide for adjustments to site specific conditions to a greater degree than for other RCRA wastes. Finally, it is clear that much of the current RCRA Subtitle C would be unworkable at mining waste sites.

Our conclusions about mitigation of the problems we saw at existing mining waste sites are less encouraging. In many case, it will be very difficult and expensive, if it is feasible at all, to eliminate or reduce ongoing releases at older sites or to mitigate past damages. Excavation, encapsulation, or even capping of wastes will be virtually impossible at some sites. However, clean ups at small sites are sometimes feasible, and O&M activities can have significant benefits at relatively low (but recurring) costs.

THE NEED FOR RCRA REGULATION OF MINING WASTES: EVIDENCE FROM TWELVE MINING WASTE AND MIXED WASTE SITES

INTRODUCTION

ICF has reviewed the history and current situation of twelve mining waste and mixed waste sites. This review suggests that RCRA regulation may be needed in some cases to prevent undue risk to human health and undue damage to the environment. If RCRA regulations are properly tailored to conditions at individual mining waste sites and are cognizant of existing state and Federal regulations, they may offer substantial benefits at moderate costs.

Nine of the twelve sites examined by ICF were still active in the 1970's and six in the 1980's. Taken as a whole, the sites show that reasonably current practices at active and inactive mines can involve a high risk of contaminant releases. The sites also show that contaminants released to surface water can have serious environmental effects, and that contaminants released to ground water can be transported significant distances. Finally, even this small sample of problems suggests some patterns that could be productively addressed by new regulations.

However, it should be recognized at the outset that the problems observed at these sites may differ significantly in scale from problems that could plausibly develop from mine wastes being generated and managed today according to modern practices. Our sample of sites is far from random: we have deliberately tried to select sites with problems. Moreover, activity at half of these sites dates back to the 1920's or earlier, or included processing operations, or both. Finally, we have not inquired into the regulatory status of any of these sites. It may be that many of the problems seen at these sites are due to noncompliance with regulatory requirements rather than to inadequate regulation.

DISCUSSION OF CASES

Releases of contaminants at these sites occurred for a variety of reasons. At all but one of the sites, releases were significant enough and contaminants were transported far enough to result in noticeable ecological damage or health risks or both.

At two sites, tailings were left uncovered or inadequately covered, creating hazards from airborne particulates (lead and asbestos) and direct contact. At Metate, asbestos tailings were regraded, inadequately covered, and used as backfill for mobile home sites. Residents were evacuated and the mobile homes crushed

These summary descriptions focus on the information that we thought was relevant, and the descriptions are not detailed. We have tried to equip the reader to understand the effects of each site on its setting and its neighbors, and the causes of those effects. We have also offered our tentative judgments about the larger significance of events at each site. These judgments are somewhat speculative (given our limited scope and cursory study) and are of course subject to dispute; therefore, we have tried to provide enough information so that each reader can make his own judgments in this area. You should carefully review our draft material under the "implications" subheading, to determine whether modifications are needed before this draft goes further.

For each of these sites, we reviewed information previously collected by SCS Engineers and the American Mining Congress, and as much additional information as could be collected in the time available. For six sites, we secured some additional written documentation. For all twelve sites, we at least had the benefit of conversations with EPA or state staff currently involved with the sites. We visited one site, to take advantage of sessions that had been scheduled to explore site conditions and remedial alternatives.

We have not tried to present detailed information on release volumes, contaminant concentrations, hydrologic or geologic setting, or contaminant fate and transport in this summary. In some cases, information of this kind is available. Please let us know whether you require data files or more detailed descriptions for your purposes.

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PICHER FIELD SITE

Background: The Picher Field is located in Ottawa County, Oklahoma and Cherokee County, Kansas and covers almost 40 sq. miles. Extensive underground mining of lead and zinc occurred in the Picher Field area from 1904 till 1958, and some mining activity continued until the mid-1970's. Over this period, more than 7 million tons of zinc and 2 million tons of lead were produced.

Problem: During mining operations, water was removed from the mine shafts by high speed pumps. However, this activity was discontinued after the closure of the mines, and the mines have flooded due to inflow of surface water and infiltration of ground water. When this water came into contact with the oxidized sulfides present in the mines, a highly mineralized acidic water known as acid mine water was produced. Abandoned mines in the area currently contain about 33,000 acre-feet of this acid mine water.

Surface discharge of acid mine water began in 1979, and this combined with runoff from tailings piles has contaminated the local surface waters. High concentrations of heavy metals have been measured in Tar Creek, and fish kills have been observed.

Ground water contamination poses the more signifcant problem. The Picher Field region is underlain by the Boone aquifer. The water in this aquifer contains high concentrations of heavy metals, dissolved cations, and high dissolved anion levels and is unsuitable for domestic supply, irrigation, or industrial cooling water without treatment.

An adjacent aquifer known as the Roubidoux is the major water producer for Ottawa County, Oklahoma, and a portion of this aquifer underlies the Boone Aquifer in the Picher Field area. Water contaminated by acid mine drainage is flowing from the Boone through abandoned deep wells to the Roubidoux. Contamination has been observed in Roubidoux wells, and it is feared that conditions may worsen.

Clean Up: This site has been placed on the National Priorities List, and a ROD was signed in June of 1984. Since then, 47 wells have been plugged and another 17 have been identified as potential conduits. An emergency action was taken in July, 1985 when a well in the town of Picher began to show signs of contamination.

This emergency action consisted of plugging the contaminated well and drilling the town a new one. The construction of a diking system to limit surface water recharge of the mine shafts is also planned. This should begin in late 1986.

Concerns: Abandoned mines in the Picher Field area are thought to contain 33,000 acre-feet of acid mine water. Although remedial action will diminish the potential health risks associated with this acid mine water, contamination resulting from past mining activities will continue for years to come. Care will have to be taken to identify additional conduit wells, and monitoring of local surface and ground water will have to continue in the future to insure that additional environmental damage does not occur.

Implications: The Picher Field site shows that heavy metals can be mobilized in ground water by acid mine water, transported significant distances, and can remain in ground water at concentrations that are of concern despite dilution and attenuation during transport. The site also shows that proper closure and maintenance at underground mines is necessary to prevent significant impacts when mining operations are discontinued. Closure measures such as the construction of diversion dikes to reduce surface water infiltration, coupled with post closure maintenance, probably could have prevented contamination from occurring.

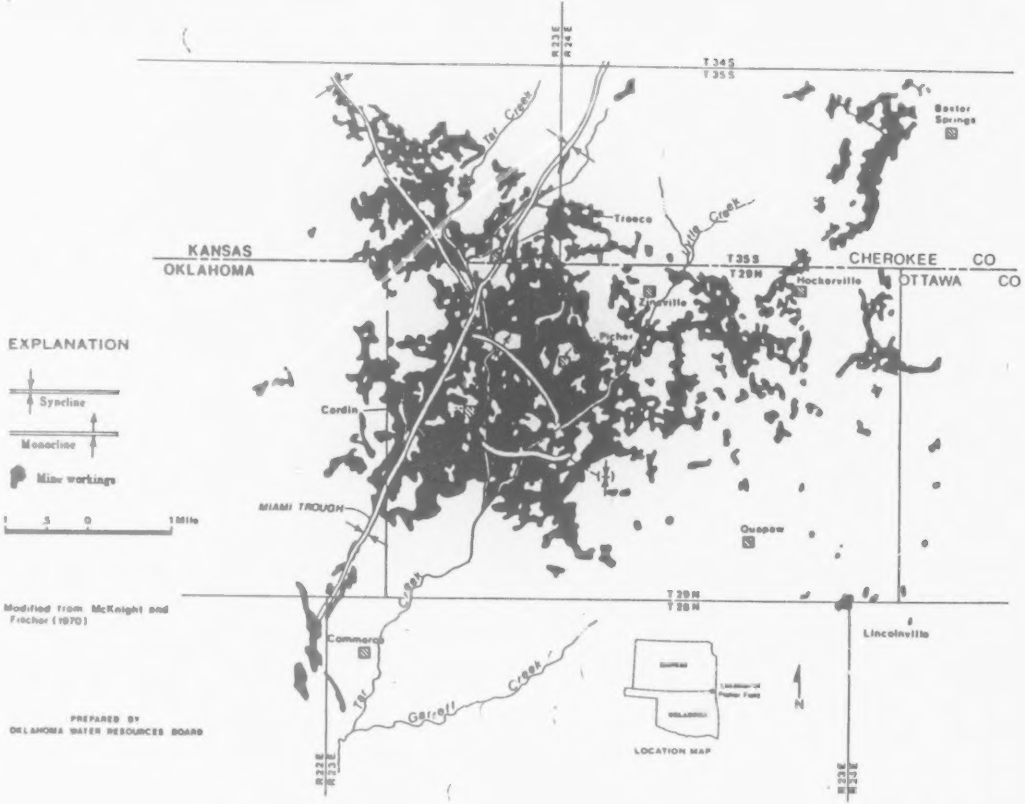

EXPLANATION
Syncline
Monocline
Mine workings
1 .5 0 1 Mile
Modified from McKnight and Fischer (1970)
PREPARED BY
OKLAHOMA WATER RESOURCES BOARD
KANSAS
OKLAHOMA
CHEROKEE CO
OTTAWA CO
T 34 S
T 35 S
T 29 N
T 28 N
R 23 E
R 24 E
R 22 E
Tar Creek
Lytle Creek
Garrett Creek
Treece
Baxter Springs
Hockerville
Zincville
Picher
Cardin
MIAMI TROUGH
Quapaw
Commerce
Lincolnville
LOCATION MAP
N

Figure 1. Generalized location of the underground mine workings in the Picher Field, Oklahoma and Kansas.

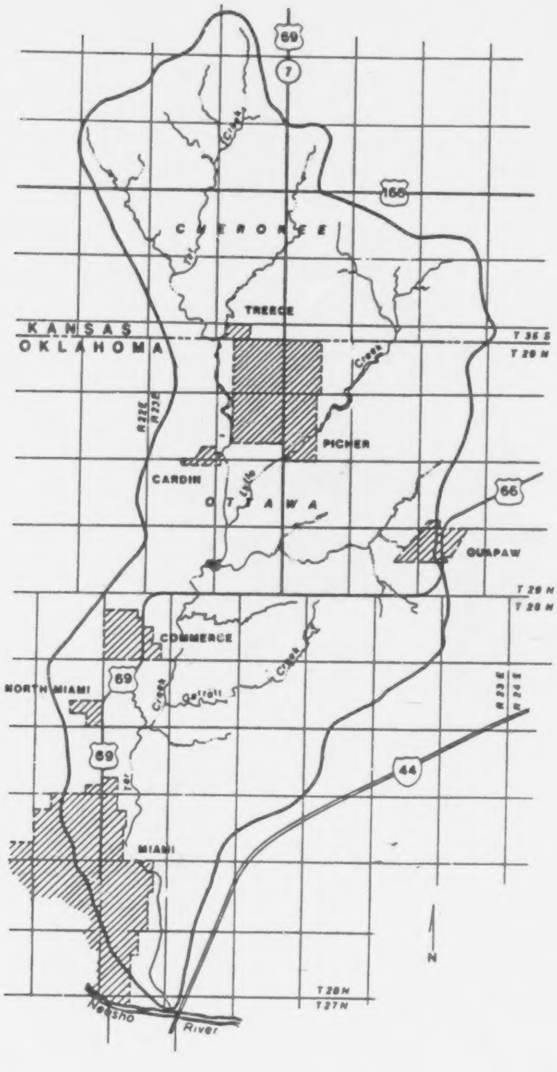

69
7
166
CHEROKEE
Tar
Creek
TREECE
KANSAS
OKLAHOMA
T 35 S
T 29 N
R22E
R23E
Creek
PICHER
CARDIN
Little
OTTAWA
66
QUAPAW
T 29 N
T 28 N
COMMERCE
NORTH MIAMI
69
Creek
Garrett
Creek
69
Tar
MIAMI
44
R23E
R24E
N
T 28 N
T 27 N
Neosho
River

Figure 4. Tar Creek drainage basin.

ZORTMAN-LANDUSKY SITE

Background: The Zortman-Landusky mining site is located in the little Rocky Mountains of Phillips County, Montana and is currently active. At the site, gold and silver ore is produced from a pit mine, and this ore is then processed with a cyanide solution.

Problem: On at least six occasions between June 7, 1982 and December 28, 1982, cyanide solution escaped from the leaching system and entered the ground and/or surface waters in Alder Gulch and other drainages. Most of these releases were small (under 1,000 gallons), but a release on December 28, 1982 may have been as large as 50,000 gallons. This release significantly contaminated the Alder Gulch and the Kalal system which supplies the community of Zortman, Mt. with its drinking water. Sampling of Kalal system water at the time of the release detected concentrations of cyanide as high as 3.2 mg/l. Currently there is no observable contamination of local surface or ground water.

Clean Up: There is currently no need for clean up activities at the site, but Pegasus Gold, Inc. has made improvements in its cyanide leaching system. For the most part, past releases were due to liner and pipe failures. Ponds have been relined and plastic pipes have been replaced by pipes constructed of steel. Two emergency ponds have also been constructed to help prevent releases. Since these improvements, there has been no release where contaminants have been able to migrate off site.

Concerns: None at present.

Implications: This is a relatively sophisticated mining operation possessing significant economic incentives to prevent contaminant releases. In spite of this, releases and contamination of a local drinking water supply have occurred. This suggests that other mining sites that lack the fairly sophisticated leaching system currently employed at the Zortman-Landusky site may be highly likely to release contaminants through system failures.

[illegible]

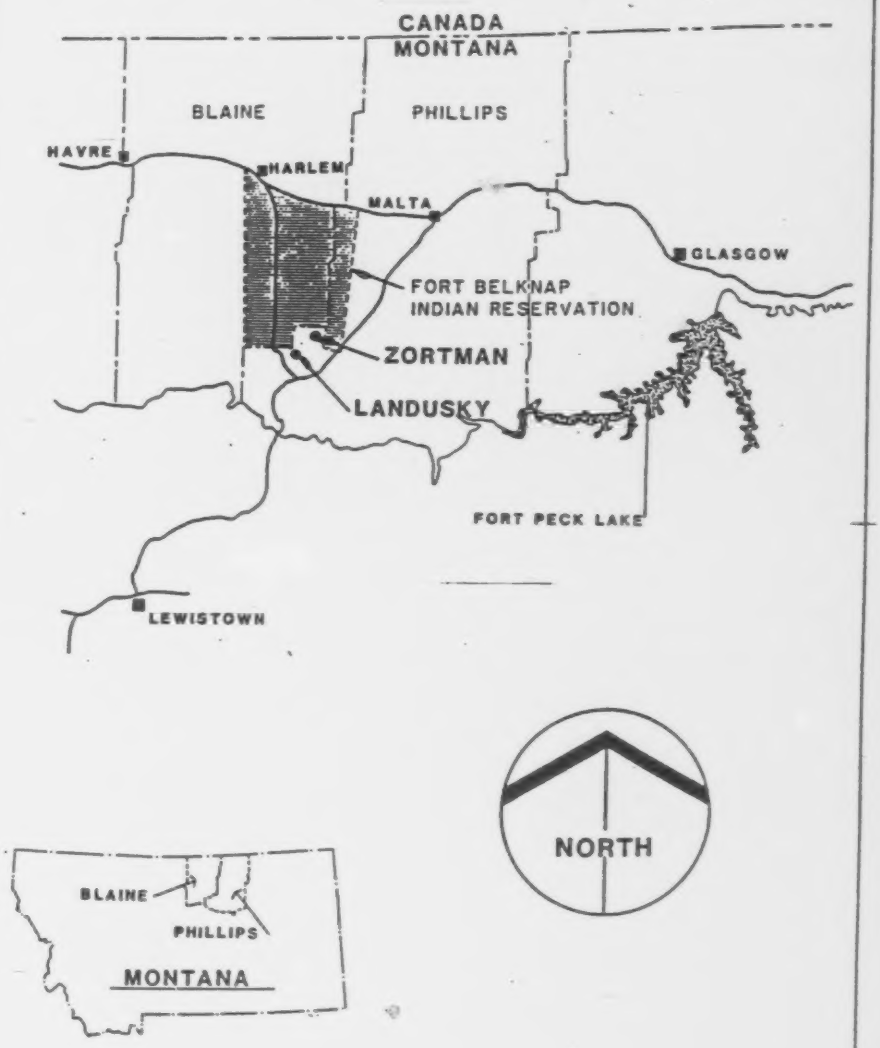
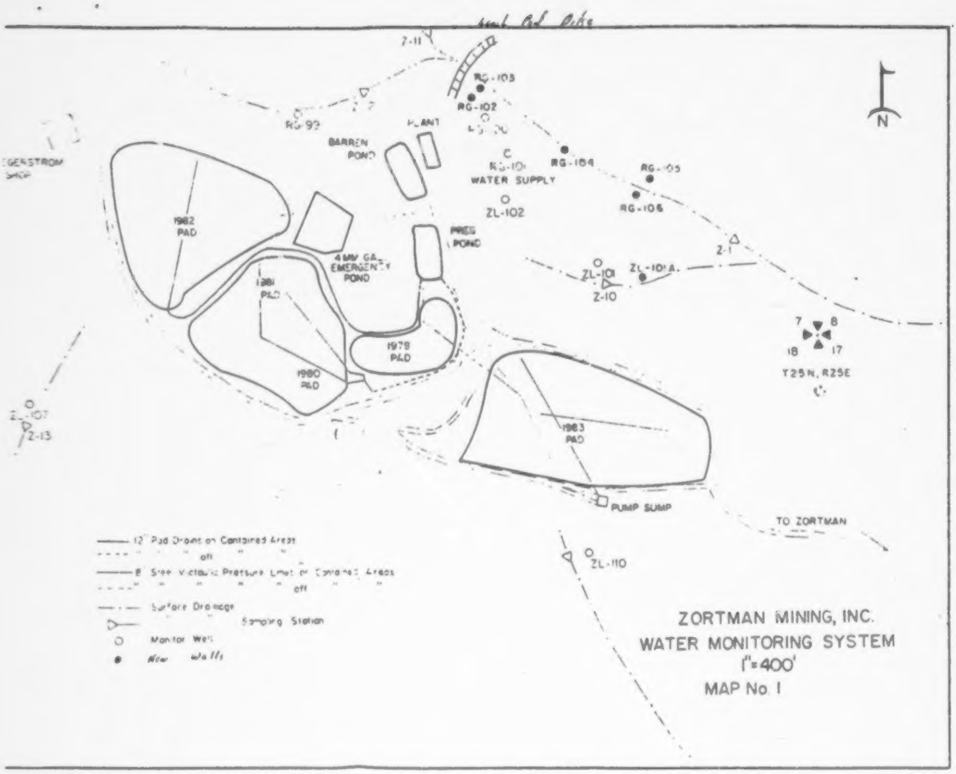

CANADA
MONTANA
BLAINE
PHILLIPS
HAVRE
HARLEM
MALTA
GLASGOW
FORT BELKNAP
INDIAN RESERVATION
ZORTMAN
LANDUSKY
FORT PECK LAKE
LEWISTOWN
NORTH
BLAINE
PHILLIPS
MONTANA

FIGURE 1
GENERAL PROJECT LOCATION MAP


Z-11
RG-99
Z-2
EGERSTROM SHOP
BARREN POND
PLANT
RG-103
RG-102
RG-101
WATER SUPPLY
RG-104
RG-105
RG-106
ZL-102
1982 PAD
1981 PAD
4 MW GAL EMERGENCY POND
PRES POND
1979 PAD
1980 PAD
1983 PAD
ZL-101
Z-10
ZL-101A.
Z-1
N
7
8
18
17
T25N, R25E
ZL-107
Z-13
PUMP SUMP
TO ZORTMAN
ZL-110
12" Pad Drains on Contained Areas
" " " off " "
8" Steel Victaulic Pressure Lines on Contained Areas
" " " " " off " "
Surface Drainage
" " Sampling Station
Monitor Well
New Wells
ZORTMAN MINING, INC.
WATER MONITORING SYSTEM
1"=400'
MAP No. 1

MCLAREN MINE SITE

Background: The McLaren gold mine and mill is located immediately east of Cooke City, Montana. The McLaren Gold Mining Co. mined ore in the area and operated a concentrator on site from 1934 to 1952. The site is currently inactive.

Problem: A flotation process was used to extract gold from the ore, and the waste material was deposited in the main bed of Soda Butte Creek. Acid drainage currently flows from the McLaren tailings into the creek. Total and dissolved iron concentrations in Soda Butte creek exceed secondary standards for drinking water supplies by approximately ten-fold, and the creek is consequently bright orange in color. Relatively high concentrations of aluminum, copper, and zinc have also been detected. The Creek is sterile immediately downstream of the tailings, and less serious degradation extends almost to Yellowstone Park.

Ground water underneath the McLaren Tailings contains high concentrations of iron and total dissolved solids, a low PH, and high specific conductance. There has been very little monitoring of ground water contamination, but ground water is the major source of domestic water in the area, and there is some concern that contamination of shallow private wells will occur.

Clean Up: There has been no clean up to date. Local officials are interested in moving the tailings to a point above the Creek, but have not secured funding that would enable them to do so.

Concerns: The tailings will continue to contaminate local surface water until they are removed to a location upgradient from the bed of Soda Butte Creek. There is also fear that the tailings dump could collapse and seriously degrade natural resources including Yellowstone Park.

Implications: This site is not directly representatvive of current mining practices because tailings were abusively deposited directly in a creek bed decades ago. However, these tailings were generated by a flotation process (which is environmentally relatively benign), and they have never been reprocessed with a cyanide or sulphuric acid solution. They have still caused significant damage. This site also shows how difficult it can be to remedy past problems: the volume of material to be moved at this site is relatively small, current placement is highly inappropriate, and a national park is threatened, but no remedial action has been taken.

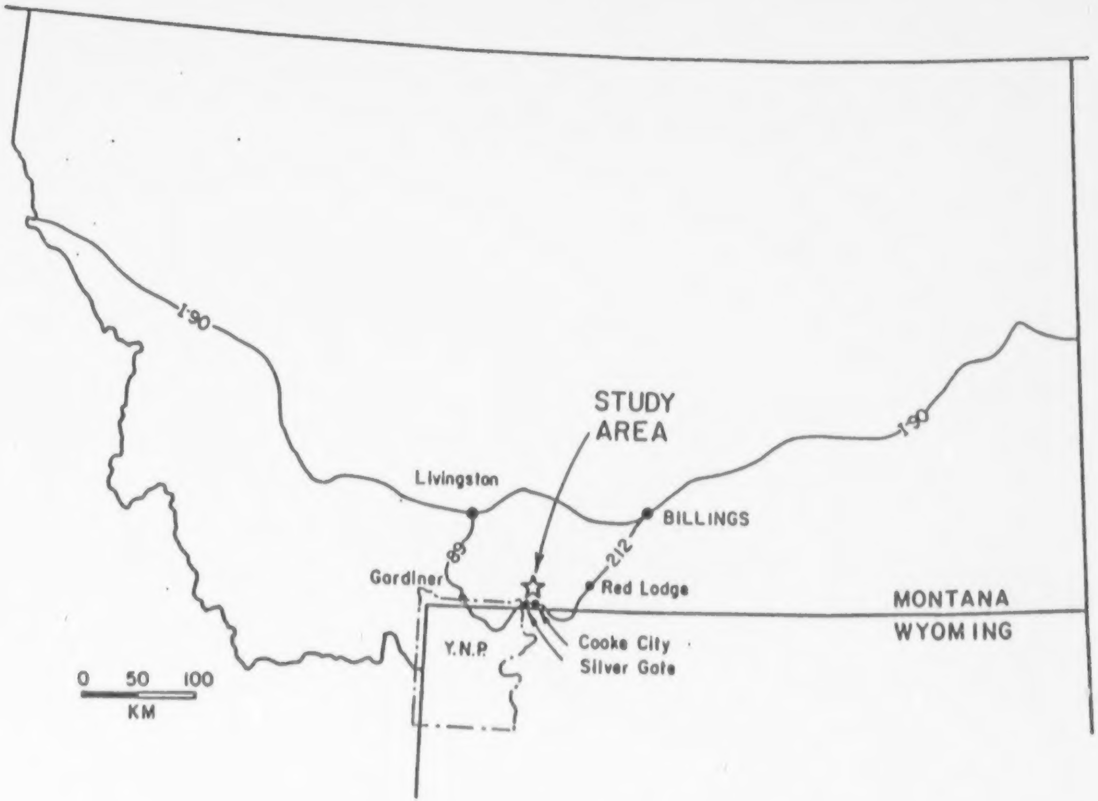

STUDY
AREA
Livingston
BILLINGS
I-90
I-90
89
212
Gardiner
Red Lodge
Cooke City
Silver Gate
Y.N.P.
MONTANA
WYOMING
0 50 100
KM

Figure 1. Location of the study area.

McLaren

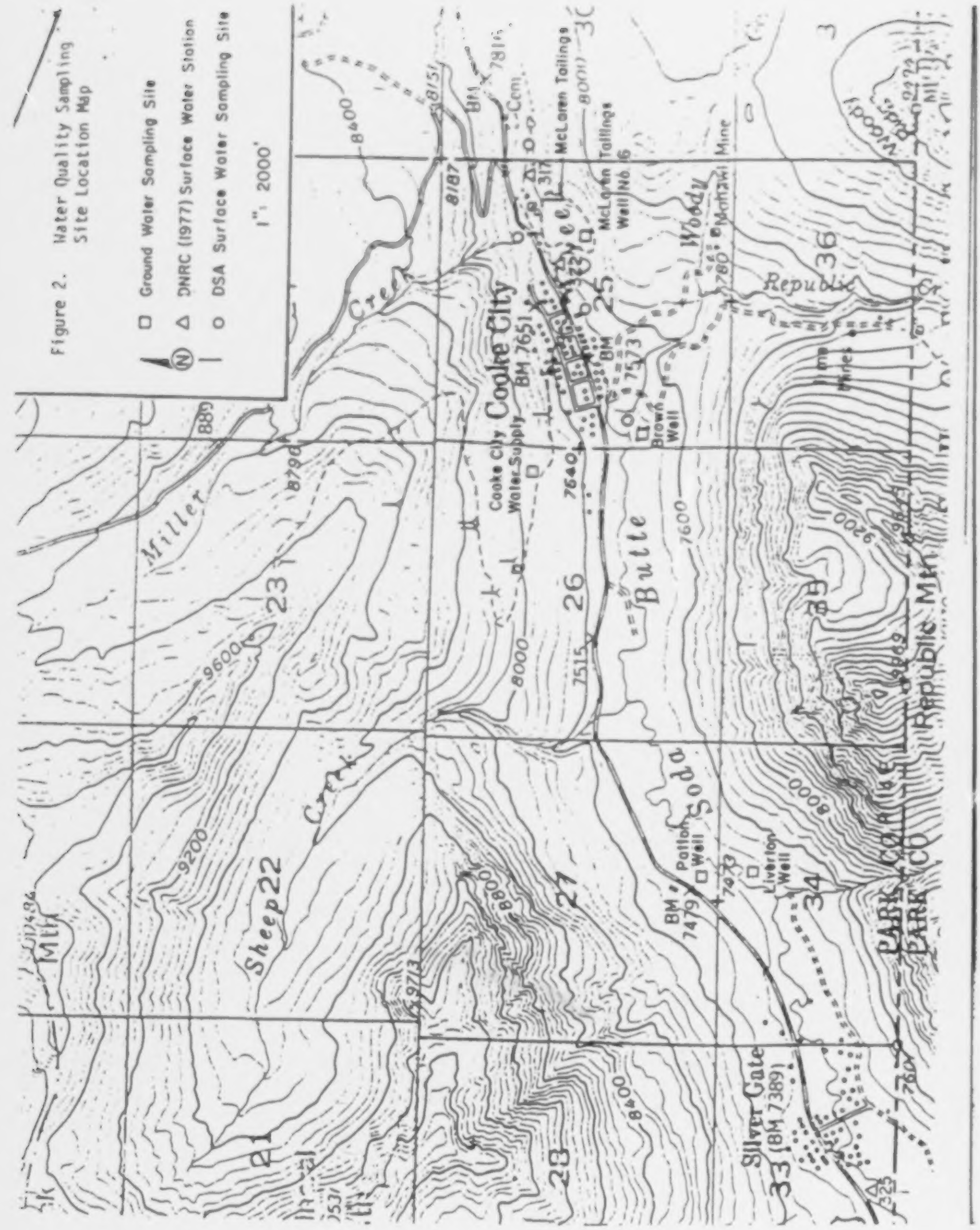


Figure 2. Water Quality Sampling Site Location Map

□ Ground Water Sampling Site
△ DNRC (1977) Surface Water Station
○ DSA Surface Water Sampling Site
1" = 2000'
N
Cooke City
BM 7651
Cooke City Water Supply
McLaren Tailings
McLaren Well No. 6
Tailings
Brown Well
Patton Well
Liverton Well
Mohawk Mine
Lime Mines
Silver Gate (BM 7389)
Miller Creek
Sheep Creek
Soda Butte
Woody
Republic
Republic Mtn
Soda Butte Creek
PARK CO
CARBON CO
21
22
23
25
26
27
28
30
33
34
35
36
3
9600
9200
8800
8400
8000
7600
7515
7640
7573
7479
7473
8187
8151
8790
9713
9862

ANACONDA/SILVER BOW CREEK/MILLTOWN SITE

Background: Gold and silver mining was initiated in the Butte, Montana mining region in the 1860's, but by the late 1870's, copper mining had become predominant. Ore was removed exclusively from underground mines until 1953 when the Berkeley Open Pit mine was opened. Both pit and underground mining operations continued until the late 1970's.

Until the turn of the century, most of the smelting was conducted at the 17 smelters located in Butte. When the Anaconda Smelter was expanded in 1902, these facilities were shut down, and all ore was shipped 27 miles by railroad to Anaconda where it was concentrated and smelted to produce anode copper. Smelting operations at the Anaconda site were discontinued in September, 1980.

Problem: Smelting and concentrating operations have resulted in a long history of local surface water contamination. Until the 1950's, waste water from Butte smelters and overflow from tailings ponds at the Anaconda smelter entered Silver Bow Creek untreated. This water was characterized by high heavy metal concentrations and low pH values. Later, waste water was channeled to Warm Springs Ponds where lime was added. This process precipitated out a good portion of the heavy metals until the mid-1960's when the ponds began to fill up with sediment and overflows of flocculated solids began to occur. This problem was partially rectified when a primary waste water treatment system was put into operation in 1972. This system involved the precipitation of waste water in holdings ponds and a substantial amount of water recycling. However, pond overflows continued to occur until smelting and concentrating operations were discontinued.

Sediment from the Butte and Anaconda sites flowed unobstructed down Silver Bow Creek to the Upper Clark Fork and finally to the Columbia until the construction of the Milltown Dam in 1906. At this time, sediment began to collect in the Milltown Reservoir, and in November, 1981, four community wells in Milltown were found to contain arsenic in excess of primary federal drinking water standards.

The sediment in the reservoir was thought to be a potential cause of contamination, and sampling indicated that the sediment contained high concentrations of arsenic, copper, lead, zinc, cadmium, and manganese.

There are over 2,000 acres of tailings piles and waste rock dumps in Butte and over 5,000 acres of wastes including tailings, slag, flue dust, and sludges at the Anaconda site. Runoff from these wastes has significantly contaminated Silver Bow Creek. Cadmium concentrations in the Creek exceed primary drinking water standards throughout the year, and arsenic, manganese, iron, and lead concentrations exceed these standards during the spring runoff season. Copper and zinc concentrations are also found in excess of secondary standards year round.

The tailings piles also leak contaminants to underlying ground water. Ground water in the Butte area is so contaminated by heavy metals that it is essentially unusable. Water is pumped in from a source 60 miles distant. Contamination of ground water has also been observed at the Anaconda site. Monitoring conducted in March of 1986 detected TDS, Sulfate, iron, and manganese concentrations in excess of secondary drinking water standards and guidelines.

Clean Up: There has been little if any clean up of the Anaconda and Butte areas. The contaminated wells in Milltown were abandoned, and new wells were drilled in areas unaffected by contamination flow from the reservoir.

Concerns: The contamination generated by tailings and waste rock piles is a long term problem, and there is some concern that this problem may worsen. Tailings piles at the Anaconda site have been neutralized to a certain extent by the application of lime. Without continued neutralization, pH will decline, and heavy metal concentrations in runoff will increase. Even if this does not occur, the tailings and waste rock piles will continue to contaminate local surface and ground water for years to come.

Arsenic contamination is also a concern. The tailings generated at both the Butte and Anaconda sites possess high concentrations of arsenic, and little attempt has been made to cover them.

Implications: Problems at this site are, to a large degree, due to smelting related wastes and abusive past practices.

However, mining operations and disposal of mining wastes also play a significant role. Moreover, placement of such wastes in unlined and uncovered piles and ponds continues at mining sites today.

Damages at these sites provide conclusive evidence that improper management of wastes that contain constituents typical of mining waste can lead to massive surface and ground water contamination. The site history shows that some constituents of concern can be transported in ground water. Finally, the site suggests that the impacts of past disposal practices can be mitigated by current maintenance activities, if those activities are sustained and of a sufficient scale. A Federal role in setting and enforcing such requirements may be apppropriate.

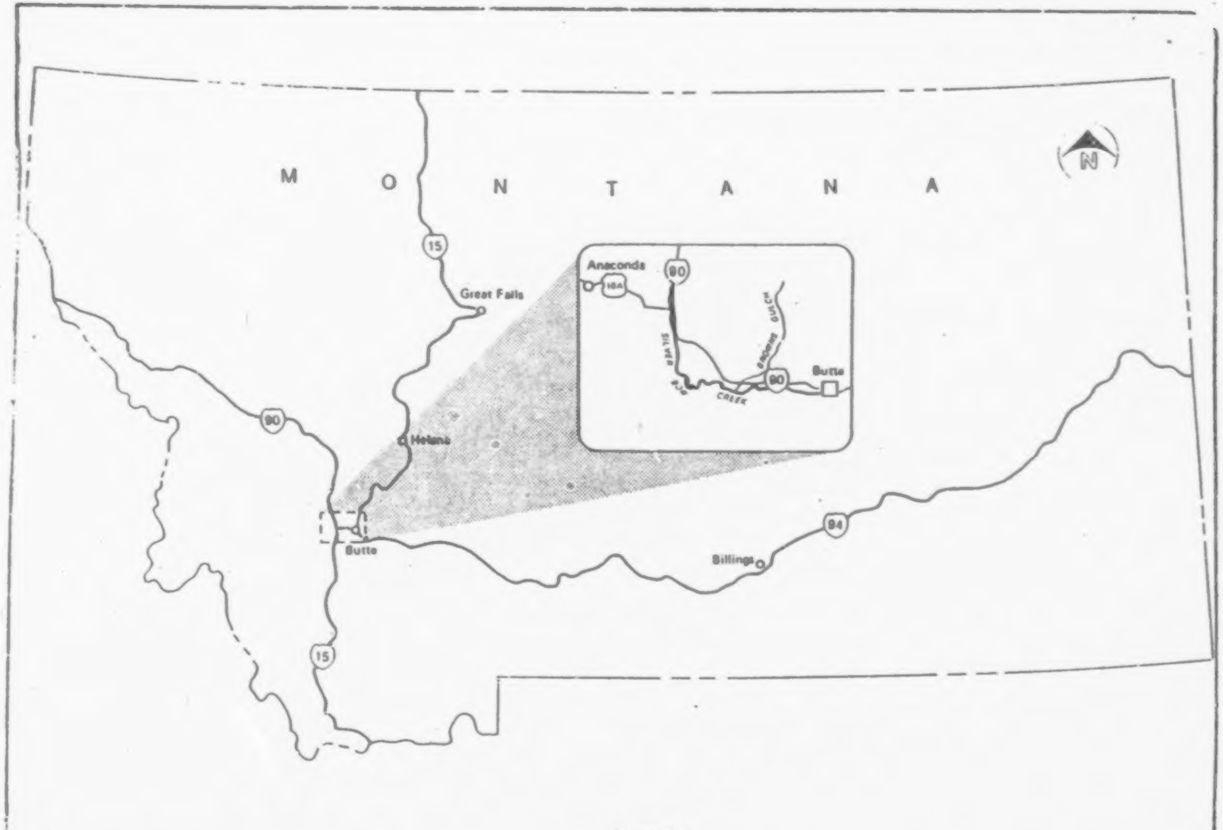

M O N T A N A
N
15
Great Falls
Helena
90
Butte
15
Billings
94
Anaconda
10A
90
SILVER
BOW
CREEK
BROWNS
GULCH
90
Butte

Figure 2-1
Silver Bow Site Location

W68122/01.8V22

DRAFT

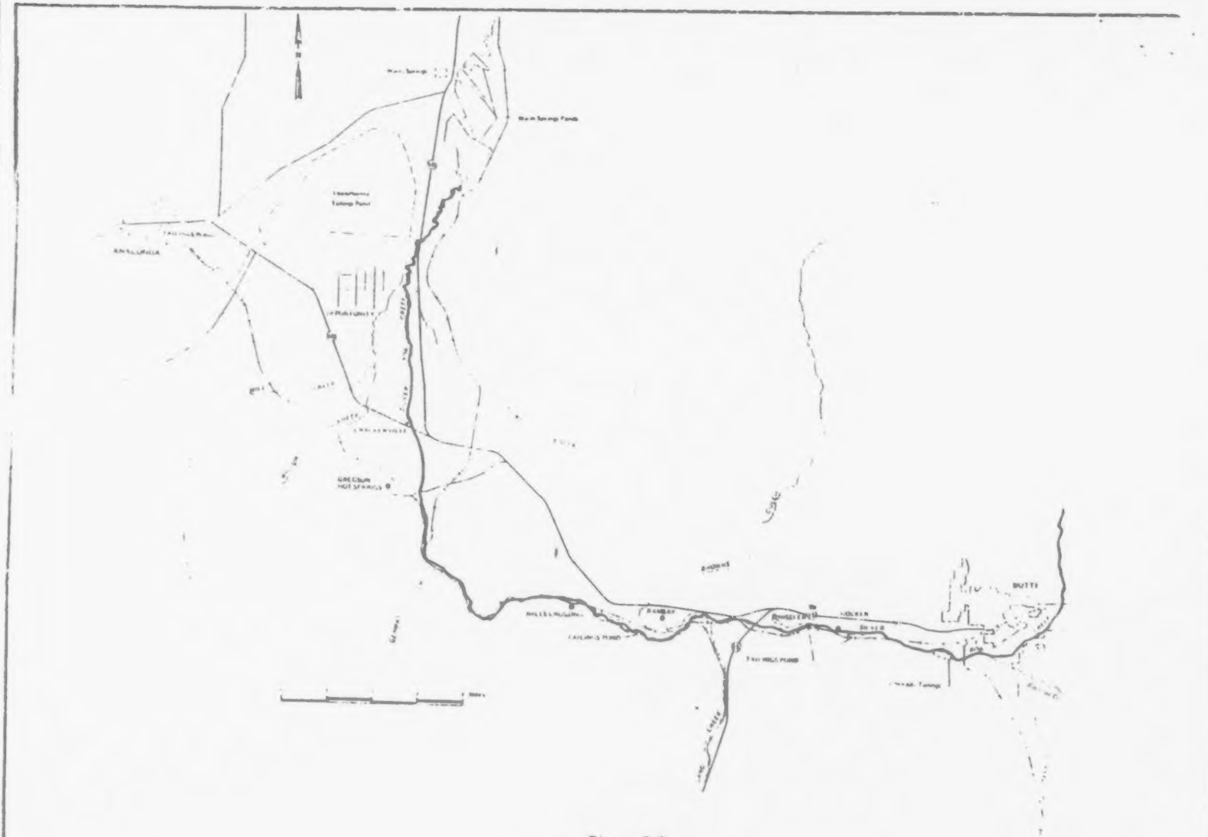

ANACONDA
GREGSON HOT SPRINGS
RAMSAY
BUTTE

Figure 2-2
Silver Bow Site Map

W68122/01.8V22

DRAFT

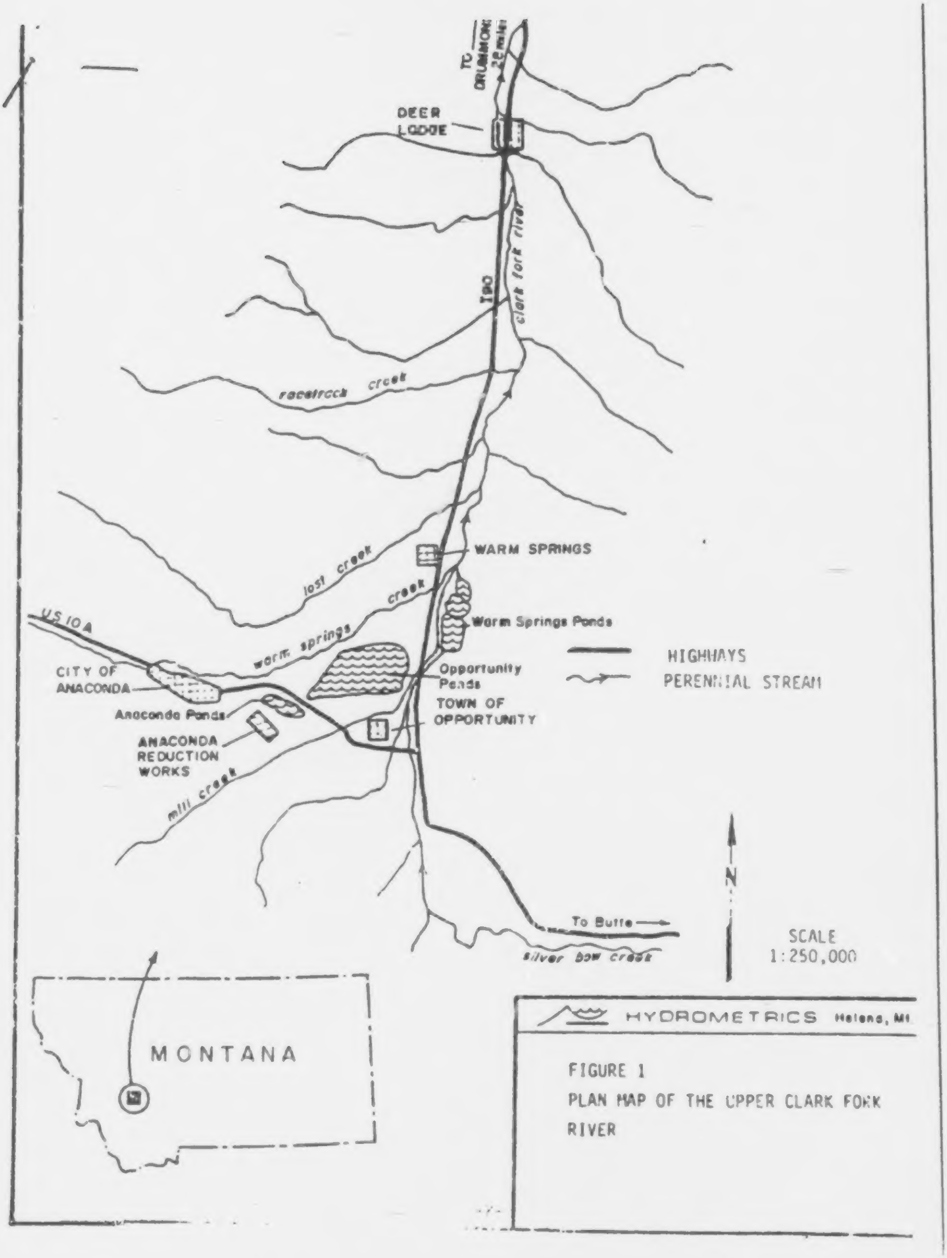

TO DRUMMOND 28 miles
DEER LODGE
I 90
clark fork river
racetrack creek
lost creek
WARM SPRINGS
warm springs creek
Warm Springs Ponds
US 10 A
CITY OF ANACONDA
Opportunity Ponds
Anaconda Ponds
TOWN OF OPPORTUNITY
ANACONDA REDUCTION WORKS
mill creek
To Butte
silver bow creek
HIGHWAYS
PERENNIAL STREAM
N
SCALE 1:250,000
MONTANA
HYDROMETRICS Helena, Mt.

FIGURE 1
PLAN MAP OF THE UPPER CLARK FORK RIVER

Anaconda

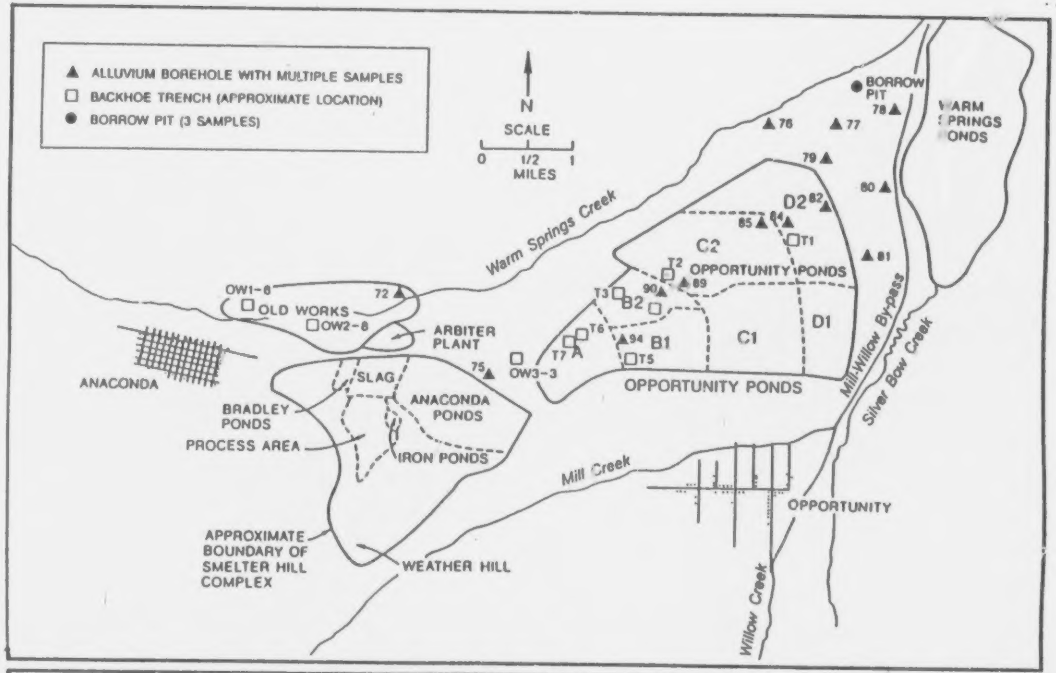

▲ ALLUVIUM BOREHOLE WITH MULTIPLE SAMPLES
☐ BACKHOE TRENCH (APPROXIMATE LOCATION)
● BORROW PIT (3 SAMPLES)
N
SCALE
0
1/2
1
MILES
BORROW PIT
WARM SPRINGS PONDS
76
77
78
79
80
81
82
84
85
89
90
94
72
75
D2
C2
D1
C1
B2
B1
T1
T2
T3
T5
T6
T7
A
OPPORTUNITY PONDS
OPPORTUNITY PONDS
Warm Springs Creek
Mill-Willow By-pass
Silver Bow Creek
Mill Creek
Willow Creek
OPPORTUNITY
OW1-6
OLD WORKS
OW2-8
OW3-3
ARBITER PLANT
ANACONDA
SLAG
ANACONDA PONDS
IRON PONDS
BRADLEY PONDS
PROCESS AREA
APPROXIMATE BOUNDARY OF SMELTER HILL COMPLEX
WEATHER HILL

Figure 1. Location of sampling stations for the alluvium investigation.

METATE MINE AND MILL SITE

Background:	The Metate site is located 75 miles east of Phoenix, Arizona. In 1973, the mill was found in violation of EPA air quality standards, and the Gila County Superior Court issued a temporary injunction requiring the operator to cease operations. The injunction was made permanent in May 1974, but before this, the property was rezoned and developed into a residential subdivision. This involved backfilling and leveling the site witn material that included old asbestos mill tailings which were then covered with native soil.
Problem:	Asbestos particles became exposed as the native soil cover wore away. Chrysotile asbestos is fibrogenic and carcinogenic, and the asbestos fibers found at the site were of a size that made them highly respirable. In October 1979, local health officials became aware of the problem, and all residents were evacuated in early 1980.
Clean Up:	Temporary remedial measure were taken in 1980. This involved demolishing the metate mill and capping the residential area with six inches of top soil. A ROD was later signed on June 3, 1983, and the mobile homes were eventually crushed and buried, and filter fabric and two feet of soil were placed over the site.
Concerns:	None.
Implications:	The problems resulting from this site are probably not representative of conditions at other asbestos mining sites, but still may indicate that asbestos tailings need to be more closely controlled than other mine and mill tailings. Unlike most other tailings, asbestos tailings pose a major health risk when left exposed to wind and human contact. Care should be taken to ensure that asbestos tailings are covered properly and that tailings do not become exposed through erosion. Federal standards may be required to prevent use of such tailings in grading operations or for building sites and to make certain that the amount and type of cover employed to close piles is adequate.

IRON MOUNTAIN MINE SITE

Background: The Iron Mountain site is located in the foothills of the Klamath Mountain Range at the north end of the Sacramento Valley in California. Copper mining at the site began in 1897, and by 1907, sulfide ore was also being produced. Ore was removed from both underground and pit mines until mining operations were discontinued in 1962.

A large quantity of acid mine drainage flows from mine portals, and in 1967, the Stouffer Chemical Company began processing this drainage through cementation copper plants. This operation was expected to return a profit. The process involves percolating the drainage through treatment tanks filled with shredded steel and is capable at peak efficiency of removing 99% of the copper contained in the drainage. These facilities were purchased by Iron Mountain Mines, Inc. on December 17, 1976 and are still being operated today.

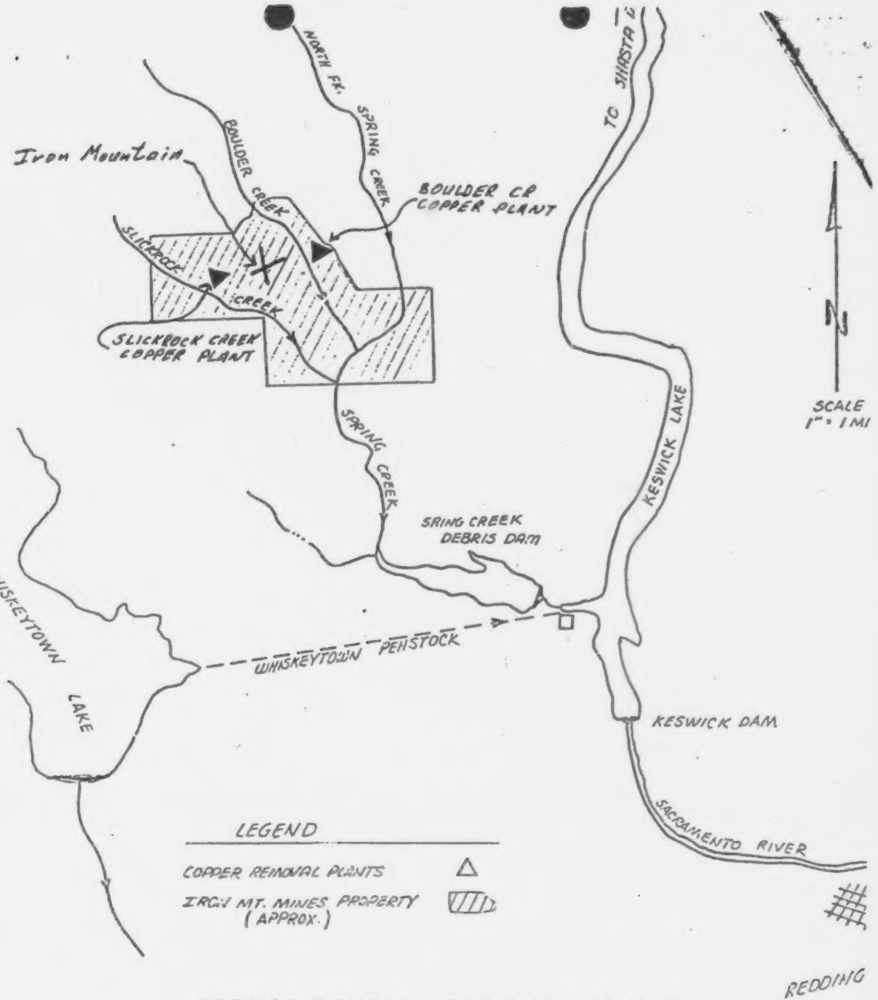
Problem: Contamination of local surface water has reached the point where Boulder Creek, Slick Rock Creek, Spring Creek, and Flat Creek are completely devoid of aquatic life. The water quality of the Keswick Reservoir and the Sacramento River has also been affected. Sampling has indicated that cadmium concentrations in the Sacramento River near Redding, California may exceed primary drinking water standards. This river is a major source of domestic supply for Redding. The inability of the concentration plants to process all acid mine drainage and to meet state standards for the drainage that is processed has significantly contributed to the contamination of local surface water. Runoff from tailings piles, sulfide deposits, and waste rock dumps is a secondary source of contamination. Effluent from both sources possesses a low PH value and carries high concentrations of cadmium, copper, iron, zinc, and aluminum.

Clean Up: An RIFS was completed for the site in the summer of 1985. Suggested remedial measures included capping ore bodies, diverting local surface water, and using lime neutralization instead of cementation to process acid mine drainage. These measures have yet to be implemented.

Concerns: Remedial measures will be expensive and will reduce, but probably not eliminate, problems. Without appropriate remedial measures, contamination will continue indefinitely.

Implications: Practices at Iron Mountain during its active life and events since mining ended do not appear to have been unusually abusive. Indeed, favorable economics have made treatment of acid mine drainage feasible. Never the less, severe adverse environmental impacts continue, and there may be some risk to human health.

This site shows the need for proper closure and post closure maintenance of mine sites. It may also indicate that Federal regulation of exploitation of old mine area is needed to supplement state efforts.


Iron Mountain
NORTH FK.
SPRING CREEK
BOULDER CREEK
BOULDER CR COPPER PLANT
SLICKROCK CREEK
SLICKROCK CREEK COPPER PLANT
TO SHASTA D
N
SCALE 1" = 1 MI
SPRING CREEK
KESWICK LAKE
SPRING CREEK DEBRIS DAM
WHISKEYTOWN LAKE
WHISKEYTOWN PENSTOCK
KESWICK DAM
SACRAMENTO RIVER
LEGEND
COPPER REMOVAL PLANTS △
IRON MT. MINES PROPERTY (APPROX.) ▨
REDDING

SPRING CREEK - IRON MT. MINES
AREA AND VICINITY
SCALE (APPROX.) 1" = 1 MILE
FIGURE # 1

COPPER CLIFFS/SILVER KING MINE SITE

Background: The Copper Cliffs mine is located on Mann Creek approximately 40 miles northwest of Council, Idaho in the Seven Devils Mining District. Underground mining of copper and silver began in 1971, and the site eventually expanded into a small pit mine approximately 1500 ft. by 200 ft. Ore was processed at a flotatation mill, and mill water was transported by pipelines to tailings ponds located below the mill on Mann Creek. The mine and mill operated sporadically between 1982 and 1985, and the site is currently inactive.

Problem: High turbidity and suspended solids problems have occurred in Mann and Indian creeks as a result of tailings containment failures. Mill tailings were placed in two retention ponds covering 10 acres and 4 acres respectively. The ponds are approximately 50 ft. deep and tailings are restrained by earth-rock dams. On four separate occasions between September 1973 and January 1974, tailings were released to Mann and Indian creeks. These releases were mainly due to overflows and breaches of the earth-rock dams. One release spilled 20% of the tailings from the larger pond into Mann Creek.

Some of the residents of Cuprum, Idaho obtain domestic water from ditches fed by Indian Creek. The increase in suspended solids that has resulted from releases has prevented them from using this source of domestic water for periods as long as six days.

Clean Up: None. Turbidity and suspended solids problems solve themselves over time.

Concerns: None.

Implications: Little actual damage has resulted from releases at this site, but releases continued to occur even after diversion ditches and spillways were put into use. The relatively large number of releases that have occurred at a site with fairly advanced tailings containment features indicates that federal regulation of tailings control may be required.

POOR BOY CLAIMS SITE

Background: The Poor Boy Claims site consists of gold and silver placer operations located along the south bank of the Colorado River just east of the Dewey Bridge in Utah. Mining operations at the site did not come to the attention of the Colorado Division of Oil, Gas and Mining (DOGM) until the Cohee Placer gold mining operation was reported in October of 1976. Permits were secured by operators at that time. Operations were discontinued after 1983.

Problem: Effluent possessing high concentrations of mercury was apparently released to the Colorado River. Sampling conducted in 1983 indicated that mercury had been used to process ore. Mercury concentrations of 0.0008 ppm and 0.0005 ppm were observed in two remnant settling ponds. No effluent was being discharged into the Colorado River at the time of sampling, but channels from the ponds to the river indicated that discharge had occurred in the past. Soil samples taken between 10 and 100 feet from the concentrating area also contained levels of mercury in excess of EP toxicity levels.

Clean Up: 30 acres of the site have been reclaimed since the discontinuation of operations in 1983.

Concerns: None. A water monitoring station was installed on the Colorado River downstream from the site, and no contamination has been detected.

Implications: It is unclear whether operations at this site between receipt of a permit in 1976 and closure in 1983 were illegal, or were simply inadequately regulated. In either case, it appears that state controls were inadequate to prevent abusive practices. Gold processing frequently involves the use of extremely toxic substances, including mercury, cyanide and sulphuric acid. Extreme care needs to be taken to ensure that these substances are not released to surface or ground water.

CYPRUS-BAGDAD MINE SITE

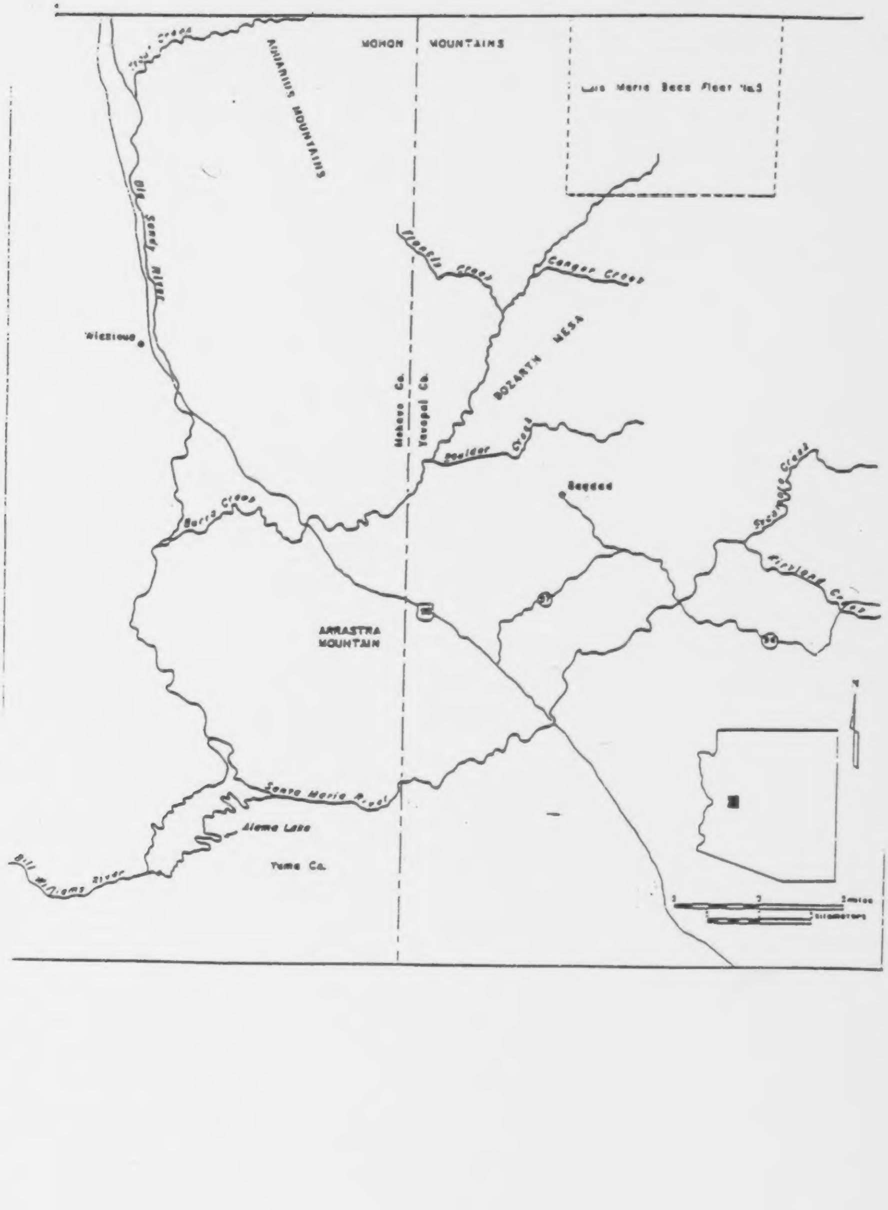
Background: The Cyprus-Bagdad Mine is located in Bagdad, Arizona, approximately 120 miles northwest of Phoenix, Arizona. The mine site consists of an open pit copper mine and mill. Copper is processed at the site by spraying sulphuric acid onto waste piles.

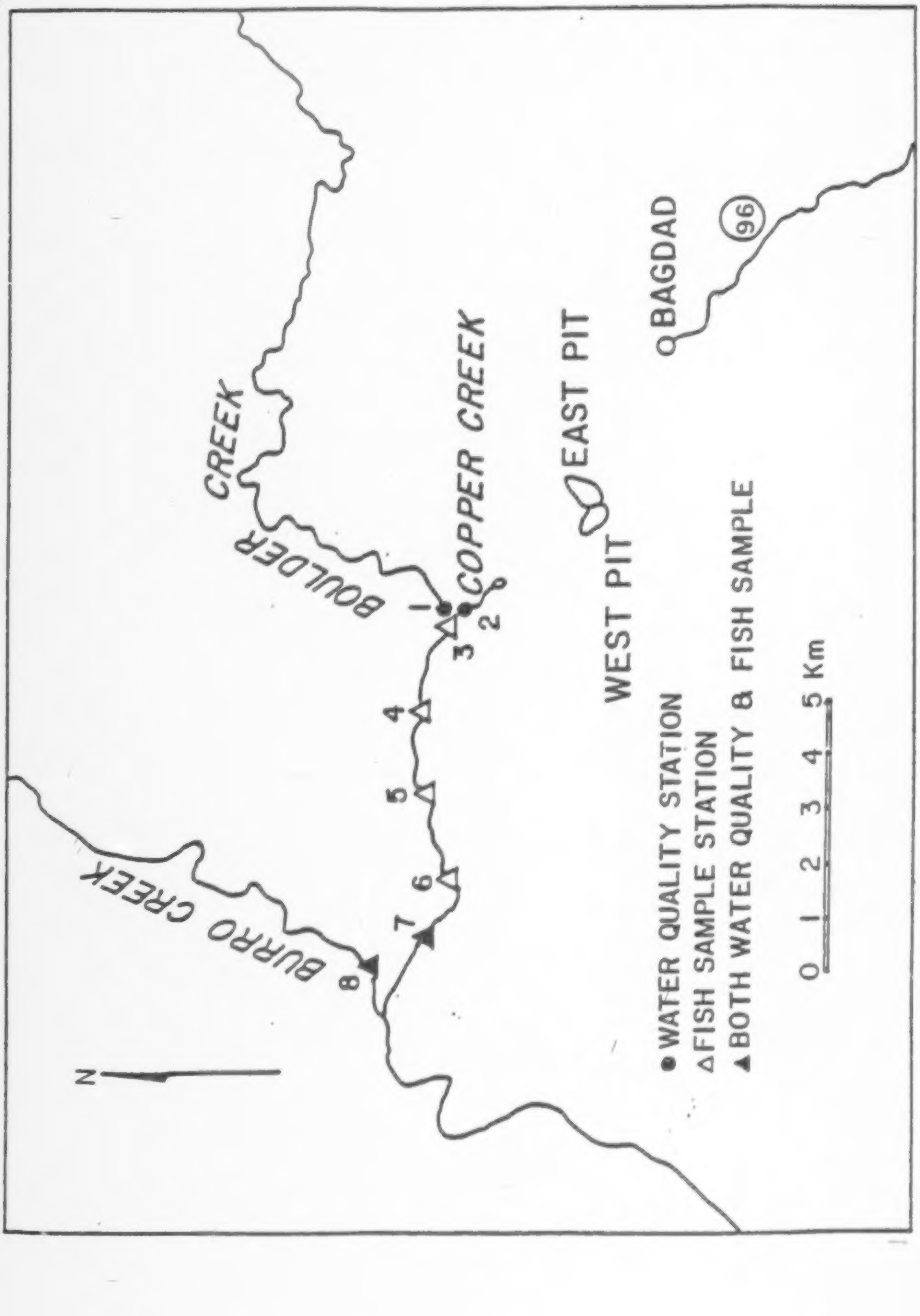
Problem: During the winter of 1978-79, heavy rains caused acid leach water to be released into Copper Creek. Sampling conducted shortly after this release indicated that Copper and Boulder creeks contained elevated suspended solids and high concentrations of copper, zinc, and manganese. At the same time, a marked decrease in the fish population in Copper Creek was observed.

Clean Up: The Cyprus-Bagdad Copper Company spent $1 million to mitigate the effects of the release and to prevent future contamination. The company added limestone to Copper Creek to aid in neutralization, built a more efficient leachate recovery system, and erected a flood containment structure at the mouth of Copper Creek.

Concerns: None.

Implications: Tailings and leachate releases resulting from systems failures can cause serious contamination of local surface water. Although the Cyprus-Bagdad release did not significantly affect a domestic water supply, similar releases in other settings could pose significant health risks to local populations. Regulatory requirements concerning tailings containment systems could greatly reduce the number of releases caused by systems failures.


MOHON MOUNTAINS
Luis Maria Baca Float No.3
AQUARIUS MOUNTAINS
Big Sandy River
Wikieup
Francis Creek
Conger Creek
BOZARTH MESA
Mohave Co.
Yavapai Co.
Boulder Creek
Bagdad
Sycamore Creek
Kirkland Creek
Burro Creek
ARRASTRA MOUNTAIN
Santa Maria River
Alamo Lake
Yuma Co.
Bill Williams River
N
miles
kilometers


BOULDER CREEK
COPPER CREEK
BURRO CREEK
EAST PIT
WEST PIT
BAGDAD
96
N
1
2
3
4
5
6
7
8
● WATER QUALITY STATION
△ FISH SAMPLE STATION
▲ BOTH WATER QUALITY & FISH SAMPLE
0 1 2 3 4 5 Km

BUNKER HILL SITE

Background: The Bunker Hill site is located in Shoshone County, Idaho near the towns of Kellcg and Smelterville. The site consists of an integrated mining, milling, and smelting complex tht covers more than 350 acres. The complex produced lead, zinc, cadmium, silver, gold and their alloys, sulfuric acid, phosphoric acid, zinc oxide, and diammonium phosphate fertilizers. Mining activity was initiated in 1887, and mining and smelting were both discontinued in 1982. Currently, only the mill, concentrator, waste water treatment plant, and Bunker Hill mine pumps are still active.

Problem: Local surface water has become contaminated as a result of mining activities. Until 1968, effluent from mines was directly discharged into the Coeur d'Alene system. Mine and mill tailings ponds were then put into use, but the Bunker Hill site has had a number of problems with their Central Impoundment Area (CIA). Despite reasonably advanced efforts to control releases, seepage and occasional equipment failures have resulted in discharges to the Bunker and Silver King creeks. These creeks run into the south fork of the Coeur d'Alene, and the water in the south fork is extremely toxic to aquatic life. Elevated levels of calcium, sulfate, phosphorous, fluoride, iron, manganese, zinc, and cadmium have been observed.

Leaching from the Central Impoundment Area has also contaminated ground water. Monitoring around the perimeter of the CIA and at downgradient wells indicated that ground water contained elevated heavy metals.

Clean Up: The Bunker Limited Partnership began shipping some hazardous wastes off site in 1982.

Concerns: Although some effort has been made to decrease seepage from the CIA, its immense size (160 acres) makes truly effective remedial measures all but impossible. Remedial measures will be expensive and probably only partially effective.

Implications: This site provides further evidence of movement of heavy metals in ground water. The site also confirms that mine and mill tailings pose a potentially long term risk to human health and the environment even when efforts are made to maintain and operate containment systems. Federal regulation of tailings containment systems may be required to reduce risks to acceptable levels.

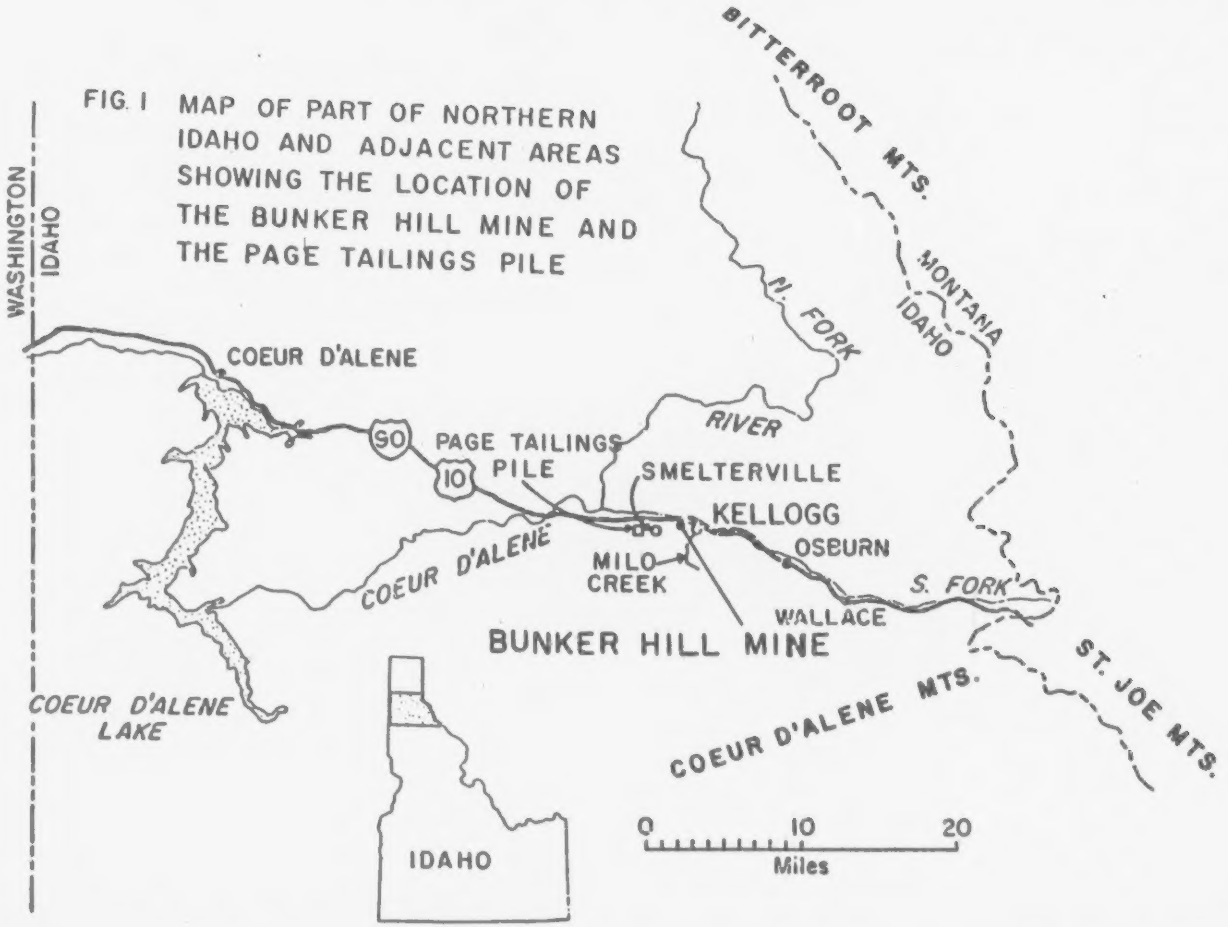


FIG. 1 MAP OF PART OF NORTHERN IDAHO AND ADJACENT AREAS SHOWING THE LOCATION OF THE BUNKER HILL MINE AND THE PAGE TAILINGS PILE

WASHINGTON
IDAHO
BITTERROOT MTS.
MONTANA
IDAHO
N. FORK
RIVER
COEUR D'ALENE
90
10
PAGE TAILINGS PILE
SMELTERVILLE
KELLOGG
OSBURN
S. FORK
WALLACE
MILO CREEK
COEUR D'ALENE
BUNKER HILL MINE
COEUR D'ALENE LAKE
ST. JOE MTS.
COEUR D'ALENE MTS.
IDAHO
0
10
20
Miles

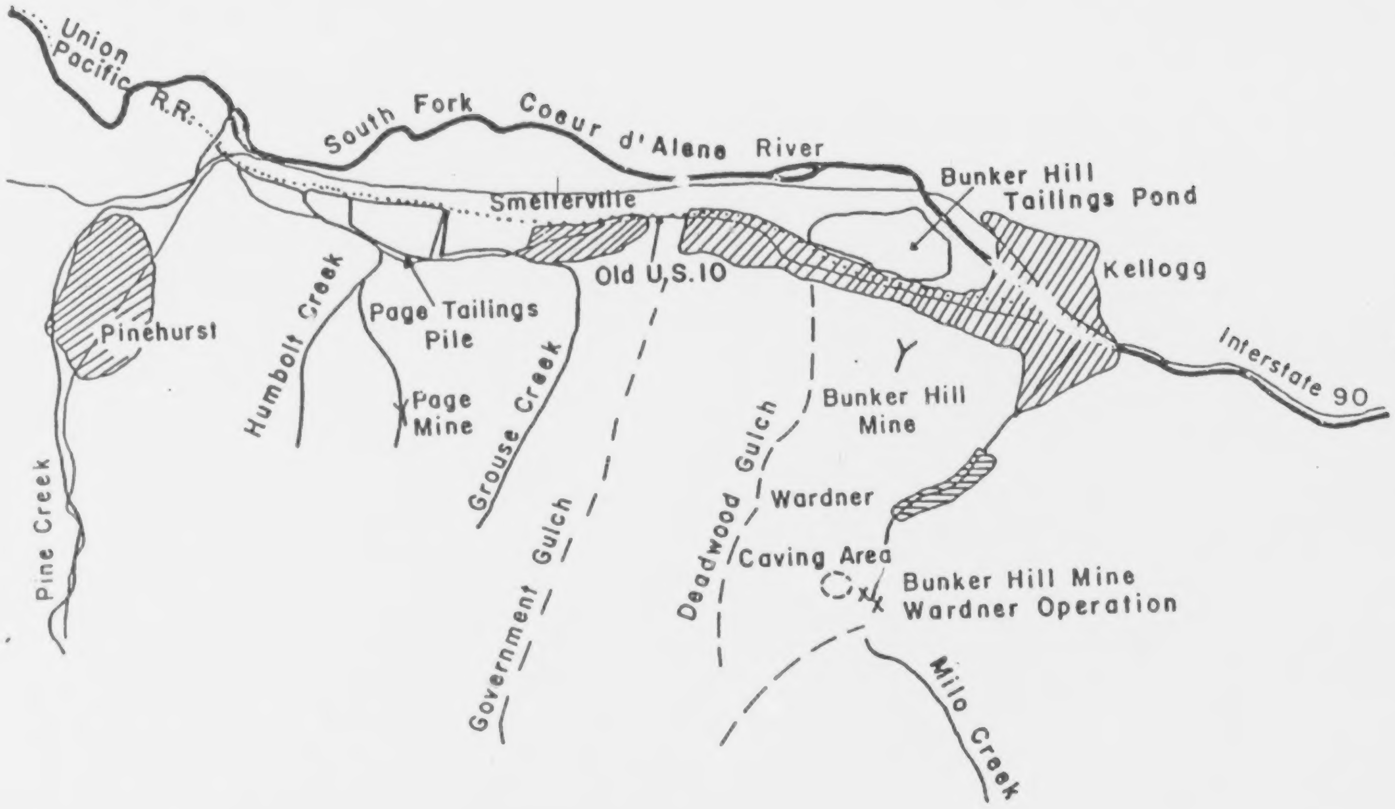

Union Pacific R.R.
South Fork Coeur d'Alene River
Smelterville
Bunker Hill Tailings Pond
Kellogg
Interstate 90
Old U.S.10
Pinehurst
Pine Creek
Humbolt Creek
Page Tailings Pile
Page Mine
Grouse Creek
Government Gulch
Deadwood Gulch
Bunker Hill Mine
Wardner
Caving Area
Bunker Hill Mine Wardner Operation
Milo Creek

FIG. 2 MAP OF KELLOGG, IDAHO AND VICINITY SHOWING THE LOCATION OF STUDY AREAS

SMUGGLER MOUNTAIN SITE

Background: The Smuggler Mountain site is located in the vicinity of Aspen in Pitkin County, Colorado. Mining activity began at the site in 1879. Silver, zinc, and lead were mined between 1880 and 1920, and silver was smelted on site during the 1880's. Only a small exploratory mine remains active today.

Problem: Housing developments have been built in the vicinity of the site, and a group of condiminiums are currently being constructed on the site. Mine tailings were supposedly used as fill for these construction projects, and soil samples from the site detected elevated levels of arsenic, cadmium, copper, mercury, zinc, and lead. These metals were observed at levels that on average were more than 10 times higher than the average background levels of these metals in undisturbed soils in the U.S. Ingestion of contaminated soil (by children), ingestion of vegetables grown in contaminated soil, and inhalation of airborne particulates are all thought to be important routes of human exposure.

Sampling of downgradient private wells have also detected contamination of ground water. Cadmium levels in excess of primary drinking water standards have been observed in two private wells.

Clean Up: None to date.

Concerns: Current and future residents of the housing developments may be exposed to levels of heavy metals in excess of established standards.

Implications: Mine waste at this site continues to pose problems even after mining operations have been discontinued, largely because there has been no effective control over the use of tailings or the use of lands were mining has been conducted. Federal regulation may be required to prevent abandoned mine sites from being used in ways which pose significant threats to human health.

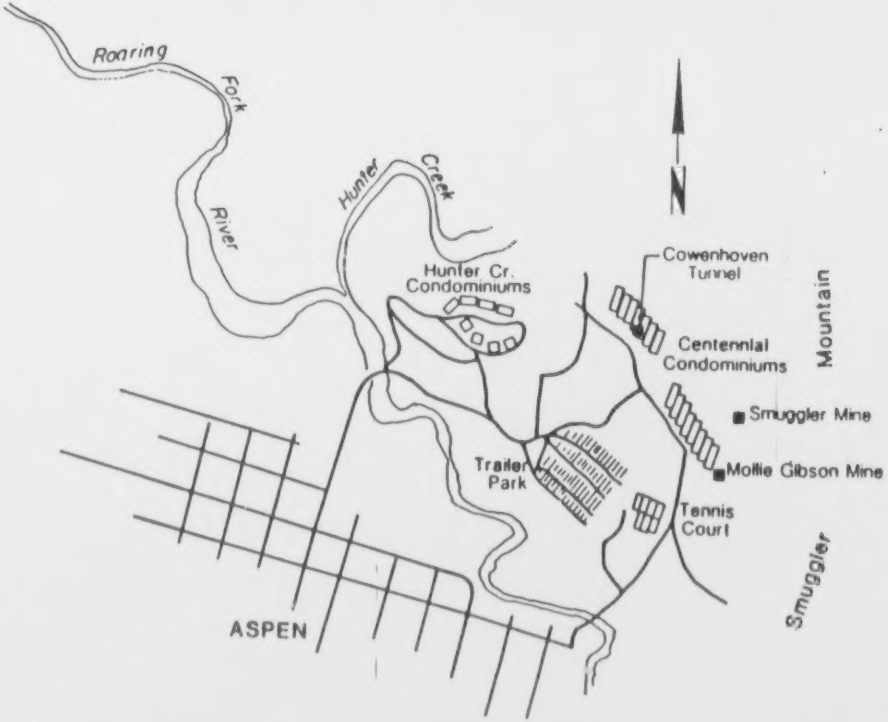
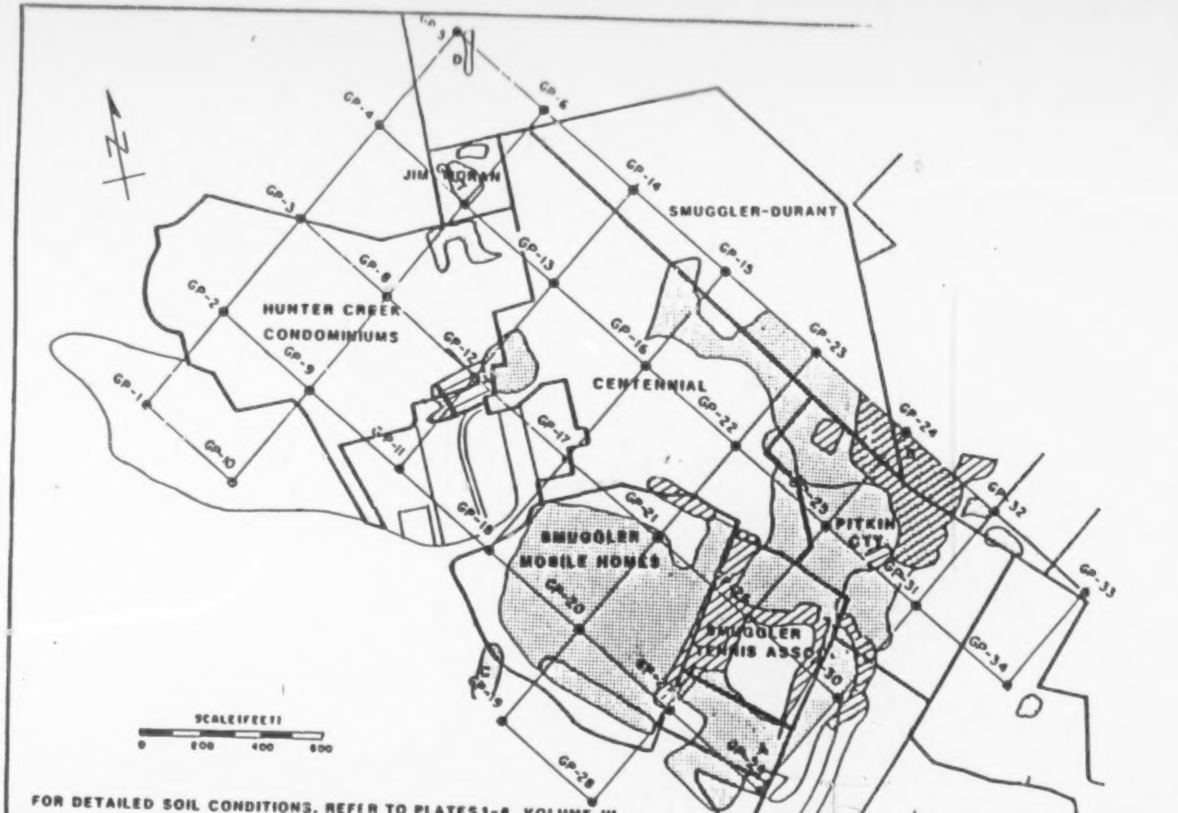

Roaring
Fork
River
Hunter
Creek
Hunter Cr.
Condominiums
Cowenhoven
Tunnel
Centennial
Condominiums
Mountain
Smuggler Mine
Mollie Gibson Mine
Trailer
Park
Tennis
Court
Smuggler
ASPEN
N

Figure 1 Present Site Features

Scale: 1 1/4 inch = 1000 ft
0 500 1000

Source: CDH 198


N
GP-1
GP-2
GP-3
GP-4
GP-6
GP-8
GP-9
GP-10
GP-11
GP-12
GP-13
GP-14
GP-15
GP-16
GP-17
GP-18
GP-19
GP-20
GP-21
GP-22
GP-23
GP-24
GP-25
GP-28
GP-30
GP-31
GP-32
GP-33
GP-34
JIM MORAN
SMUGGLER-DURANT
HUNTER CREEK CONDOMINIUMS
CENTENNIAL
SMUGGLER MOBILE HOMES
PITKIN CTY.
SMUGGLER TENNIS ASSOC.
SCALE(FEET)
0
200
400
600

FOR DETAILED SOIL CONDITIONS, REFER TO PLATES 1-6, VOLUME III

FIGURE 2

MAP OF SURFACE SOIL CONDITIONS
AT THE SMUGGLER MOUNTAIN SITE

(DOES NOT SHOW SOIL UNITS TYPICALLY UNDER 1000 ppm RANGE)

□ Manmade Fill
▨ Mine Tailings
▨ Manmade Fill & Mine Tailings
● Surface Sampling Locations

SOURCE: RI/FS Smuggler Mountain Site, F.C. Hart, 8/

EAGLE MINE SITE

Background: The Eagle mine is located 25 miles northwest of Leadville in Eagle County, Colorado, and the site consists of both an underground mine and mill. Mining activity was initiated prior to 1920, and zinc, lead, copper, silver, cadmium, and indium have all been produced at the site. The underground mill was operated until December 1977 and was then converted to treat mine waste water. The site was sold to Miller Enterprises in November 1981, and all mining operations and waste water treatmentwere discontinued after 1984.

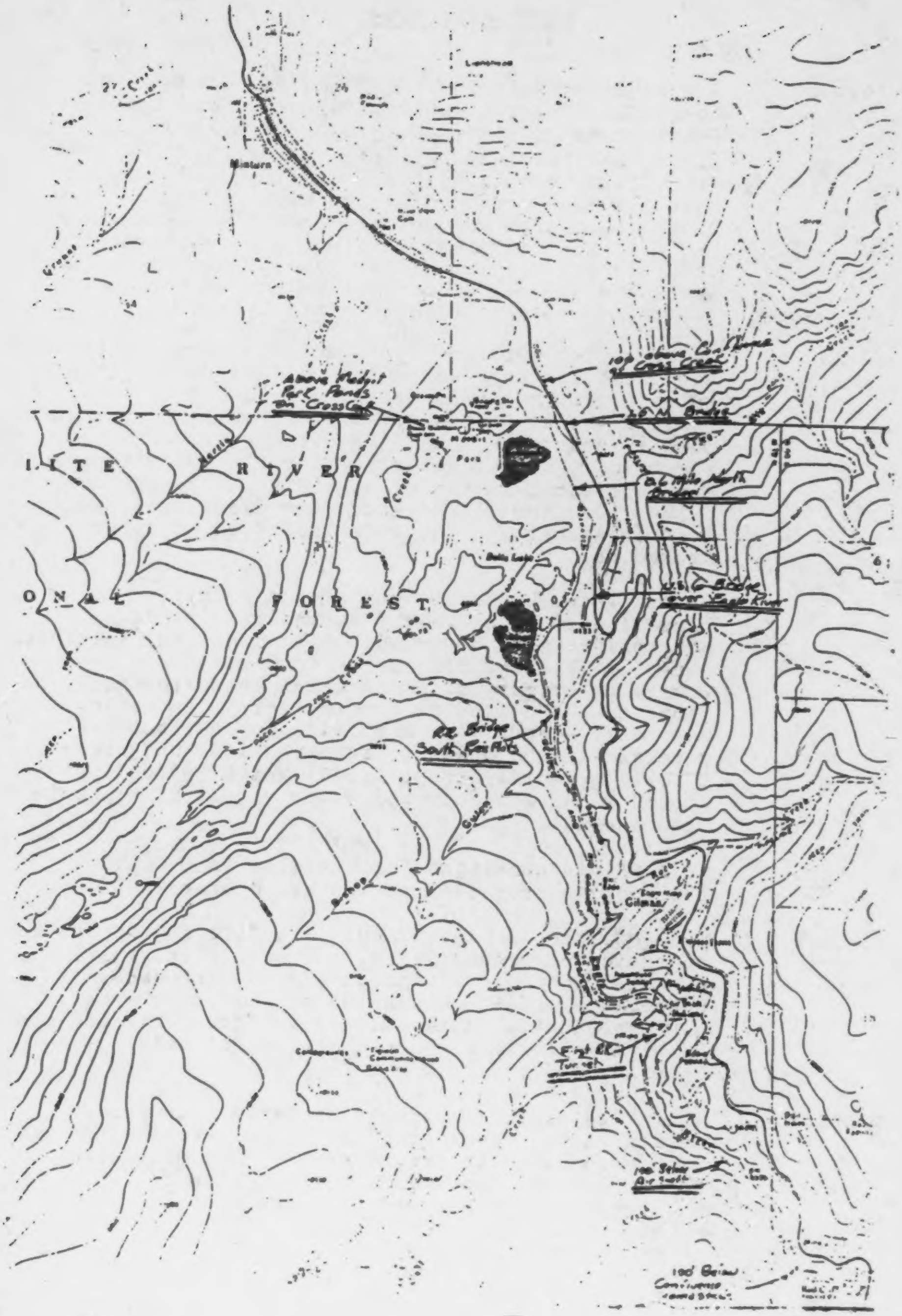
Problem: Seepage from tailings ponds and discharge of treated mine drainage have contaminated local surface water. Soluble iron has been measured in Cross Creek and Eagle River at concentrations exceeding stream water quality standards, and fish kills have been reported. Surface water is also the major source of domestic water in the area, and the citizens of Gilman have complained about the discoloration of drinking water and the increased cost of water treatment.

Ground water has also been significantly contaminated by seepage from tailings ponds. Monitoring wells downgradient from the tailings have detected lead and cadmium at concentrations exceeding primary drinking water standards and zinc, manganese, and iron at concentrations exceeding secondary standards. Contamination has not been detected in any domestic supply wells, but there is a small community (pop. 1,300) which relies upon ground water for dommestic supply just down gradient from the tailings.

Clean Up: An RIFS was completed for the site in December, 1985, but no remedial action has been taken.

Concerns: The underground mine tunnels are flooding due to the intrusion of ground water, and mine portals are expected to begin discharging acid mine water by December of 1986. Discharge of acid mine water would seriously degrade local surface water and most likely result in the contamination of Gilman, Colorado's domestic water supply.

Implications: This site provides further evidence that heavy metals can be transported from mine waste sites and abandoned mines in ground water. The site also points out the importance of post closure maintenance of mines and mine waste sites.


Minturn
Above Maloit Park Ponds on Cross Crk
100' above Confluence of Cross Creek
2.5 M Bridge
0.6 Mile North Bridge
U.S. 6 Bridge over Eagle River
RR Bridge South Fork
ITE RIVER
ONAL FOREST
Gilman
First RR Tunnel
100' Below Air Shaft
100' Below Confluence

Acid Mine
Drainage
REC APRIL 89
FR: SAM KRAUSS,
McLAUGHLIN MINE.

EDUCATIONAL MATERIAL FROM
MINERAL POLICY CENTER
1325 MASSACHUSETTS AVE. NW, #550
WASHINGTON, D.C. 20005

LONG TERM PREVENTION OF ACID MINE DRAINAGE

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INTRODUCTION

The long term prevention or abatement of acid mine drainage depends on the continued effectiveness of the control measures. These measures may involve covers of various types including soil, water or synthetic membranes, drainage or infiltration controls, base addition or long term drainage collection and treatment in chemical plants or wetlands. Such control measures are subjected to both extreme disruptive forces such as storms, floods, fires and earthquakes, as well as the lesser but perpetual action of weathering and chemical change, erosion, frost and root action and the burrowing activities of animals and man. Under these forces there is a deterioration which eventually leads to failure of the control measures. Failure can be prevented by an adequate program of monitoring and maintenance.

The period to failure and the nature of the failure mechanism determines the risk of environmental impact, the required monitoring, and frequency and cost of maintenance. Different control measures have different inherent stabilities (resistance to failure). The selection and application of the most appropriate may result in minimal visual monitoring (every few years) with inexpensive minimal maintenance only every few decades, with extremely low risks of environmental impact. Inappropriate controls may require continuous monitoring and maintenance at high cost with a high risk of environmental impact.

A MODEL FOR THE VISUALIZATION OF LONG TERM AMD

The author has found it useful, in his visualization of acid generation and drainage, to develop the analogy illustrated in Figure 1. A description of this analogy follows.

Factors Controlling Acid Generation

Acid generation occurs in a **sulphide reactor**. This reactor contains a finite load of sulphide. The rate at which the reaction proceeds is dependant on:

i) The nature of the reactive sulphides; with some oxidizing much more rapidly than others, EPA, 1977. The form of the sulphide is also important with disseminated framboidal pyrite oxidizing more rapidly than large-cubical crystal forms.

ii) The rate at which the other fuels:
  - oxygen and
  - water,

  are introduced into the reactor.

iii) The initiation of bacterial oxidation may increase the rates of oxidation from 50 to 1 million times, Lundgren, 1971. Both the chemical and biological oxidation rates are substantially dependant on the pH in the reactor as illustrated in Figure 2 (Knapp, 1987). Typically the reactor starts up slowly with local slow chemical oxidation, and increases rapidly as biological oxidation starts after the pH has dropped below 5. On a single lump of waste rock, as illustrated in the inset in Figure 1, individual crystals of pyrite may develop a surface coating of low pH adhered water, providing the conditions for rapid bacteriological oxidation long before similar conditions develop on other surfaces of the otherwise naturally alkaline host rock.

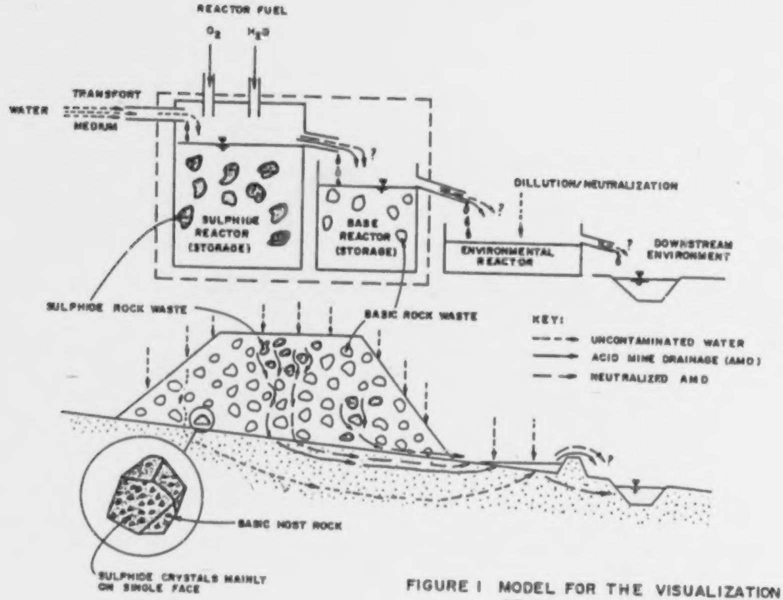

REACTOR FUEL
O_2
H_2O
TRANSPORT
WATER
MEDIUM
?
SULPHIDE REACTOR (STORAGE)
BASE REACTOR (STORAGE)
?
DILLUTION/NEUTRALIZATION
ENVIRONMENTAL REACTOR
?
DOWNSTREAM ENVIRONMENT
SULPHIDE ROCK WASTE
BASIC ROCK WASTE
KEY:
UNCONTAMINATED WATER
ACID MINE DRAINAGE (AMD)
NEUTRALIZED AMD
?
BASIC HOST ROCK
SULPHIDE CRYSTALS MAINLY ON SINGLE FACE

FIGURE I MODEL FOR THE VISUALIZATION OF LONG TERM A M D

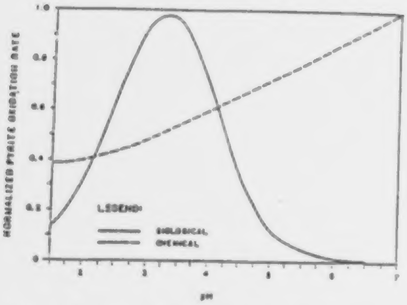


FIGURE 2 : EFFECT OF pH ON BIOLOGICAL AND CHEMICAL OXIDATION RATES (AFTER KNAPP, 1987)

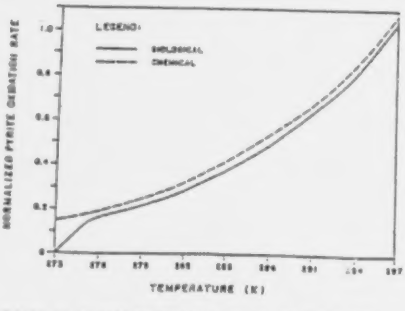


FIGURE 3: EFFECT OF TEMPERATURE ON BIOLOGICAL AND CHEMICAL OXIDATION RATES (AFTER KNAPP, 1987)

iv) Oxidation rates increase as the temperature increases as illustrated in Figure 3 (Knapp, 1987).

Acid is produced as a result of the oxidation reactions and stored in the vicinity of the site of generation, unless transported away from the site by diffusion or advective water flow. In the absence of flowing water the movement rate is extremely slow, and the acid products accumulate (are stored) in the vicinity of the sulphides and inhibit further oxidation. Movement of acid from the sulphide reactor site is therefore dependant on the presence of water as a **transport medium**. Removal of the acid products allows the oxidation reactions to continue. Metals and other products are dissolved in the acidic water. Flow or discharge from the sulphide reactor is therefore an acidic water flow containing dissolved metals commonly referred to as Acid Mine Drainage or simply AMD.

Factors Controlling Natural Neutralization

AMD is discharged into the **base reactor** in which it is neutralized. If the reaction rate in the base reactor is slower than the rate at which AMD is delivered to it then only partial neutralization occurs. There may still be acidic drainage while a net base potential remains. In practice this may occur on a lump of rock waste where the sulphide is on the exposed "joint" surfaces and oxidizing rapidly and the base material is contained in the interior of the waste lump from which it is released more slowly.

The base reactor has a finite quantity of base material and after this is consumed no further neutralization occurs. Depending on the amount of base material contained in the base reactor, and the rate at which AMD is introduced to it, the effective period of neutralization will vary. Thus if AMD generation or transport from the sulphide reactor is slow (as may occur in a dry climate or if a low permeability cover is installed) then the neutralization may be effective for a very long time, but the end result of acidic drainage may be the same. Some of the dissolved metals in AMD, including zinc, are not adequately precipitated on neutralization and such drainage may still be detrimental to the receiving aquatic environment.

The acid/base accounting method of AMD potential testing measures the total quantities of acid and base generating potential but does not take into account the rates at which the two reactors work. Hence the need for kinematic tests, particularly when the acid and base potential are nearly equal.

Factors Controlling AMD and Environmental Impact

AMD draining from the waste deposit passes through or over soils which have a neutralization capacity. AMD is also mixed with surface and groundwater streams which both neutralize and dilute the AMD. The **environmental reactor** results in some improvement of the AMD. As the store of basic materials close to the deposit is consumed the AMD plume migrates further from the deposit, resulting in an ever increasing impact zone. At some point the volume of dilution and neutralization streams with which it merges is sufficient that the effect of AMD is abated.

Some environments have an extremely high load of basic materials in the soils, surface and ground waters. This is the case in many of the old deeply weathered landscapes with well developed old soils. In Canada and Norway, where recent glaciation has stripped off all old soils, only relative fresh rocks and new, unweathered soils are exposed. These conditions generally yield soils, ground and surface waters which are low in neutralizing capacity. Thus the potential for extensive impact on the surface and groundwaters downstream from the deposit are large.

For all waste deposits there is a level of AMD release which can be sustained by the environment without significant damage. It is the objective of AMD abatement measures to reduce AMD releases to below this level.

ROCK WASTES DUMPS AND TAILINGS DEPOSITS AS REACTORS

Waste Rock Dumps

A waste dump can be visualized as a series of sulphide and base reactors on both a micro and macro scale. On each piece of rock waste there may be zones which are either acid generating (and acidic) or base yielding (and basic). The most reactive lump produces acid which allows the pH to depress, initiating rapid biological oxidation. Drainage from this acid lump onto lumps below it rapidly consumes excess base allowing a zone of high reaction rates to spread along the drainage path.

Zones of predominantly acid rock waste will yield AMD and zones having a net base potential will neutralize AMD flowing into them. The pH of the seepage from such a dump is dependant on the flow path which the transporting water has followed and may be either basic or acidic as illustrated in Figure 1. It is common to have both basic and acidic seeps from the same dump during the early stages of AMD development.

Neutralized AMD will contain some of the dissolved metals taken up in the acid flow zones and not deposited on neutralization. Zinc is often a persistent metal in this respect. Thus the evolution of AMD from the dump is cronologically as follows:

i) All seepage characteristic of unoxidized leaching of the waste rock.

ii) Some seeps develop characteristics of neutralized AMD (Lundgren et al, 1972). This stage may be evident within weeks or months of waste placement but may take years.

iii) Some seeps begin to exhibit depressed pH and characteristics of AMD. The stage may develop within months of placement but a number of Western Canadian examples exist of it taking 10 to 20 years for the first such seeps to develop.

iv) pH depression develops in all seeps from AMD generating zones of the dump. For many mines this may be the entire waste dump. Documentary evidence exists of highly reactive dumps that have developed to the maximum rate of AMD within a few years of construction. Our understanding is not complete for the time rate of increase for the much slower developing reactors. Based on the observations for (iii) above it may take tens to hundreds of years.

v) The quality of seepage improves as the sulphides are consumed and that in the faster of the sulphide reactors is exhausted. Slow reactors (such as sulphides in the interior of large hard rock lumps) can last for a very long time. This phase is observed to last for hundreds of years for large waste dumps.

Seepage flows through waste dumps are usually partially saturated, and flow tends to follow preferred flow channels. Some of the waste lumps are regularly flushed by infiltrating water while the majority are seldom wetted by flowing water. Acid products accumulate on the seldom flushed lumps with the result that acid products accumulate. During periods of high flushing (spring run-off or high precipitation periods) some of these products are flushed out resulting in high flows with very high contaminant concentrations. Because hydraulic conductivities are usually high in the dump, the period between infiltration and seepage is short, resulting in rapid flushing and seepage responses to precipitation.

The air conductivity of dumps are also extremely high. The tendency for coarse waste with large air voids to accumulate at the base of the dumps usually provides an easy passage for air into the base of the dump. Thermal gradients develop due to natural temperature ranges in the ambient air as well as due to the exothermic reactions of oxidation in the waste dump. Such thermal gradients result in a 'chimney effect' in the dump with the result that oxygen is drawn into the dump and is readily available to fuel sulphide reactions. Changes in the barometric pressure causes the dumps to 'breath'. This 'lung effect' results in air flowing in along the more conductive channels deep into the dump. The entire dump therefore serves as a reactor with an ample supply of oxygen and water for sulphide oxidation.

In hard rock dumps which are resistant to weathering the amount of sulphides exposed and available for oxidation is limited, limiting the rate of reaction. The mass of sulphides exposed to oxidation conditions are almost directly proportional to the surface area of dump material which increases approximately as the inverse of the cube of the average lump or particle mass in the dump. Where the rocks slake (break down with time) rapidly, increasing the surface area of exposed sulphides, the rate of sulphide oxidation may increase rapidly. Fortunately the slaking effect, if it reduces the rock to soil size particles, may also reduce the dump conductivity to both air and water sufficiently to result in reduced reactions.

Tailings Impoundments

The factors controlling acid production and AMD from tailings impoundments differs significantly from those operative in waste dumps. These differences are summarized in Table 1.

The sulphide content in tailings is often much greater than in the mine wastes from the same ore deposit, resulting in a potential for much larger acid production.

Because of the fine grind, a high percentage of the sulphides are exposed and available for oxidation. If only these two conditions controlled reaction rates, then tailings would be expected to be much greater acid producers than rock wastes.

The fine grind and mixing that occurs in the milling process results in a much more even distribution of the sulphides and base materials in the deposit. The tailings are also generally mainly in water or in a high moisture state, particularly during the operating life of the impoundment. The combination of intimate mixing of sulphides and base materials and the ample water to transfer acid and base ions over the small distances separating grains results in a hugely reduced potential for the development of 'trigger' or 'hot spots', and hence the initiation of fast reactions due to biological leaching. Conditions suitable for acid generation usually only develop after tailings placement is discontinued. Thus the initiation of acid generation in a tailings dam usually starts long after the same initiation in waste dumps at the same mine.

In contrast to dumps, infiltration and flow of air and water is restricted by the relatively low conductivity of the tailings. This flow restriction results in the development of zones of oxidation (sulphide reactor zones), neutralization (neutralization reactor zones) and contaminant migration as illustrated in Figure 4. These zones have been described and discussed by Robertson, 1987.

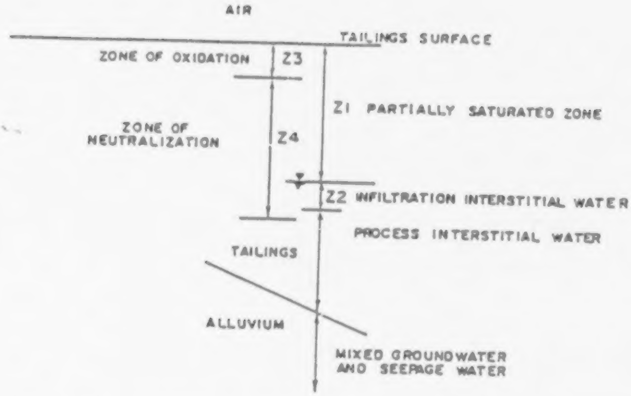

AIR
TAILINGS SURFACE
ZONE OF OXIDATION
Z3
Z1 PARTIALLY SATURATED ZONE
ZONE OF NEUTRALIZATION
Z4
Z2 INFILTRATION INTERSTITIAL WATER
PROCESS INTERSTITIAL WATER
TAILINGS
ALLUVIUM
MIXED GROUNDWATER AND SEEPAGE WATER

FIGURE 4(a) WATER QUALITY MODEL FOR TAILINGS COLUMN

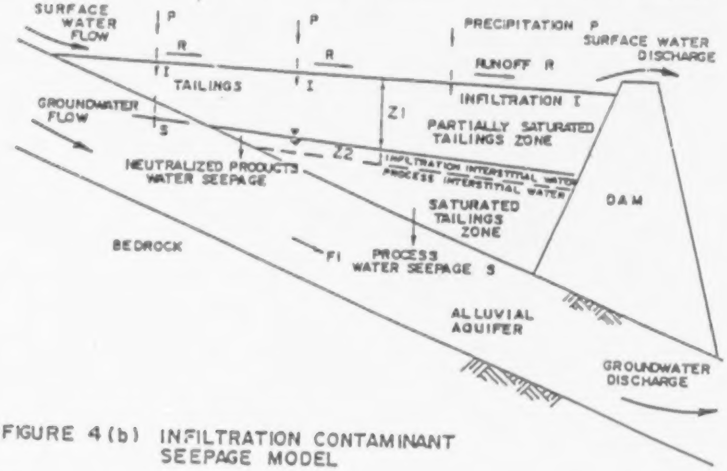

SURFACE WATER FLOW
P
R
I
P
R
I
PRECIPITATION P
SURFACE WATER DISCHARGE
RUNOFF R
TAILINGS
INFILTRATION I
GROUNDWATER FLOW
S
Z1
PARTIALLY SATURATED TAILINGS ZONE
Z2
NEUTRALIZED PRODUCTS WATER SEEPAGE
INFILTRATION INTERSTITIAL WATER
PROCESS INTERSTITIAL WATER
SATURATED TAILINGS ZONE
DAM
BEDROCK
F1
PROCESS WATER SEEPAGE S
ALLUVIAL AQUIFER
GROUNDWATER DISCHARGE

FIGURE 4(b) INFILTRATION CONTAMINANT SEEPAGE MODEL

TABLE 1

COMPARISON OF ACID MINE DRAINAGE FACTORS IN WASTE DUMPS AND TAILINGS IMPOUNDMENTS

A. ACID GENERATION	WASTE DUMPS	TAILINGS IMPOUNDMENTS
i) Sulphide source	- Variable in concentration and location - Conditions may vary from sulphide rich to basic over short distances	- Conditions uniform often with very high sulphide content.
ii) pH variation	- Highly variable conditions over short distances	- Fairly uniform conditions with a few major horizontal zones
iii) Initiation of Rapid Oxidation	- Usually starts immediately after first wastes are placed (in "trigger" spots)	- Usually starts after tailings placement ceases
iv) Oxygen Entry	- Enters freely along highly conductive flow paths at base of dump and large open void spaces. 'Chimney' and 'lung' effects.	- Restricted by water in the tailings void spaces and the lower conductivity of the partially saturated void spaces
v) Seepage	- Seepage rapid along preferential flow paths	- Seepage slow and uniform
vi) AMD Releases	- Large infiltration resulting in large seepage from toe and to groundwater - Rapid release following generation, sometimes with both neutralized and acid AMD seeps.	- Large early surface AMD run-off - Lower infiltration - Gradual transition in seeps from process water, to neutralized AMD, to AMD.

After tailings placement is discontinued, oxidation usually initiates fairly quickly at the surface of the tailings impoundment where tailings are exposed above water and where oxygen has free access to the tailings. Surface drainage from the tailings impoundment turns acid fairly quickly. The downward movement of the AMD is extremely slow because of the generally low permeability of the tailings and foundation soils. Flow is relatively uniform and there is not a route for rapid preferential seepage as in dumps. The period for the immergence of the first AMD contaminated groundwater may be extremely long (tens, possibly hundreds of years).

After impoundment closure, there is often a slow lowering of the water table in the impoundment as drainage takes place. The partially saturated zone, in which oxidation can occur, increases. Figure 5 illustrates the rapid increase in the gaseous difusivity of tailings or soil as the moisture content reduces. Drying of the upper surface of the tailings impoundment also results in dessication cracking of the fine tailings. This increases the conductivity to both air and water. If sandy zones are located in the deposit the cracks connect with the pore spaces in the sandy zones and the lung effect results in oxygen transmission to these zones. Thus we often observe yellow, oxidized sand zones interlayered with gray unoxidized slimes layers near the surface if the tailings impoundment.

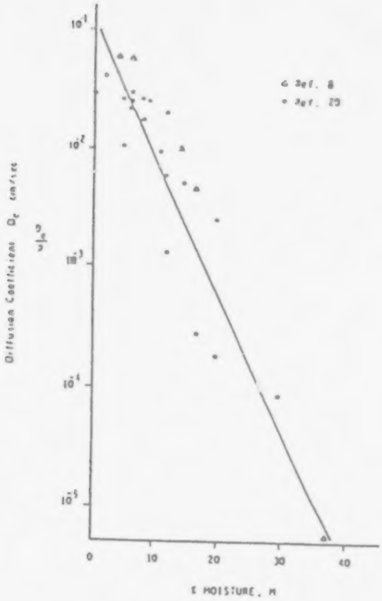


FIGURE 5 : MOISTURE DEPENDENCE OF THE DIFFUSION COEFFICIENT (ROGERS AND NIELSON, 1981)

ALTERNATIVE AMD CONTROL TECHNOLOGIES

AMD control technology is conveniently divided into three broad classifications.

- Prevention of acid generation
- Prevention of AMD migration
- AMD collection and treatment

Prevention Of Acid Generation

Prevention of acid generation in the first place is usually the most desirable of the control technologies. If generation does not occur, then there is no risk of its transportation into the environment.

This may be achieved by:

i) Removal of the pyrite source

Methods of pyrite removal have been reviewed by Hester and Associates, 1984. Removal of a portion of the sulphides from tailings, by flotation for example, may make the difference between

ii) Rendering acid generation minerals inactive by the development of surface coatings

Hester and Associates, 1984, demonstrate that while these approaches hold promise they do not as yet represent applicable technology.

iii) Exclusion of water

Exclusion of water to the extent that acid generation could not occur is not considered practical (Robertson, 1987).

iv) Control of biological oxidation

Bacterial action control by the application of bactericides have been discussed by Sobek, 1987. Periods of effective control for admixed bactericides do not exceed 5 years and surface spraying has been found to be not effective. This measure provides no control of chemical oxidation.

v) Temperature control

If freezing conditions can be achieved, acid generation can be prevented. This control has application in regions of permafrost, with adequate precautions being taken to prevent seasonal surface thawing. Elsewhere surface covers have the effect of reducing the maximum surface temperatures, and therefore oxidation rates, but do not provide adequate control for abatement.

vi) Exclusion of oxygen

The exclusion of oxygen to the extent that acid generation is reduced to acceptably low levels requires the placement of a cover with an acceptably low level of oxygen diffusion.

- Water covers. Such covers have been found to be effective in the control of acid generating materials placed below water. Both the cover and the water in the interstices help to prevent the oxygen transfer to the sulphides. It may be necessary to place a fine grained cover layer over submerged coarse rock waste to prevent oxygen transfer by convection of the pore water. Care must be exercised in the placement of old wastes below water to ensure that the solution of contained acid products is allowed for.

- Soil covers. Gaseous diffusion through soil covers differs little from that for tailings (Halbert et al, 1983, Silker and Kalkwarf, 1983). The effectiveness of the soil cover reduces rapidly as the moisture content of the cover reduces (Figure 5). Long term disruptions of the soil cover may occur as a result of erosion, cracking, frost action, root action, and burrowing animals. Current modelling techniques do not adequately allow for such disruptions. The comparative reduction in oxygen entry would be greatest for covers over very coarse waste dumps where 'chimney' and 'lung effects' would be greatest. There is considerable doubt that shallow soil covers will provide sufficient oxygen transfer control to abate acid generation. They reduce the infiltration of water and hence reduce the acid transport mechanism as discussed in the next section. Mathematical models and computer codes (such as the RATAP model, (SENES et al, 1986.) have been developed to evaluate the effect of soil covers on acid generation rates.

  Bog covers are a combination of water and soil covers, involving a layer of non acid generation soil placed over the acid generation waste together with shallow flooding, such that a layer of the soil cover is always saturated. The bog vegetation and saturated soil provides the barrier to the oxygen transfer (Steffen, Robertson and Kirsten, 1986a).

Complex covers are layered covers primarily for the purpose of infiltration control and are discussed in the next section.

- Synthetic covers. A number of synthetic covers have been proposed.

Synthetic membrane covers such as polyvinyl chloride (PVC), high density polyethelene (HDPE) etc. have been applied with some success (Caruccio and Geidel, 1983, and 1986,). The extremely low conductivity of such membranes to air offers the potential for oxygen exclusion. Main causes of failure would be holes due to imperfection in manufacturing and installation and formed after installation due to dump deformations and puncturing. The long term degradation and loss of plasticity and ultimate cracking limits the long term effectiveness of such thin membranes. In combination with low conductivity bedding materials or cover layers, the effects of such cracking can be considerably reduced. To entirely prevent oxygen entry it may be necessary to entirely encapsulate the waste in such a membrane.

Other synthetic membranes such as geopolymers, asphalts, and cements suffer from cracking and disruption. The potential for cracking increases with:

- reduced tensile strengths
- reduced plasticity and ductility
- increased dimensional instability due to humidity or temperature changes
- degradation with aging.

Because of their dimensional instability, bentonite covers have displayed a tendency to crack on dessication (Geidel and Caruccio, 1985). A cover material currently being evaluated which shows promise is high volume polypropylene fibre reinforced sulphate resistant gunite. The corrosion resistant fibres provide tensile strength and flexibility and spread out any cracking which occurs. It has the considerable advantage that it can be applied to steeply sloping surfaces and areas inaccessible to large mechanical equipment. Cracking generally would result in sufficient oxygen entry for acid generation to continue, though at a reduced rate. The costs of such synthetic covers are often prohibitively high.

vii) Addition of Base

Base addition can take a number of different forms:

- Blending of net acid producing and net acid consuming wastes to achieve a net acid consuming mixture. This is what is effectively practiced in the coal strip mines of the eastern USA (Skousen et al, 1987). Its effectiveness for hard rock mines has not been demonstrated. The flat horizontal layering of the sedimentary overburden over the coal seams and the strip mining method are well suited to achieving consistent and intimate blending of the overburden. The distribution of waste rock types and the mining sequence in hard rock mines is considerably more variable and consistent blending more difficult and costly to achieve. Where poor blending has been done, acid generation may still continue in localized zones resulting in neutralized AMD seepage of a quality which is still of concern to the downstream environment.

- Base addition and blending can be practiced to allow consistent control throughout the waste. The base material must be sufficiently fine and uniformly distributed that the rate of base neutralization is sufficient to prevent AMD development. Large isolated lumps of limestone would be inadequate even though the acid/base account may indicate a reserve of base. Coarsely ground limestone or calcarious rock is desirable. The rate of solution (hence depletion) and pH resulting from the addition of large quantities of slaked lime may be unsuitable for both short and long term AMD control.

- Surface applications are not considered effective for long term control.

Prevention Of AMD Migration

Where acid generation is not prevented, it is necessary to resort to prevention of acid and acid product migration. Since water is the mode of transport, the control technology relies on the prevention of water entry to the waste pile. Control of water exit from the pile is of little value since in the long term all water entering the pile must exit, long term storage being neglectable. The control requirements are as follows:

- diversion of all surface water flowing towards the pile
- interception or isolation of groundwater flow towards the pile
- prevention of infiltration of precipitation into the pile

Diversion facilities usually consist of ditches. Diversion of surface flows, while easily implemented are often difficult to maintain in the long term as discussed in the next section. The best long term solution to such surface flows is to select a disposal site which minimizes the need for diversion.

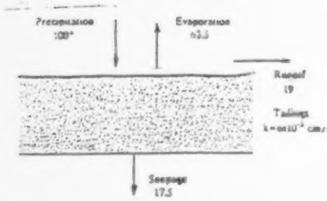
If the pile is located over a groundwater discharge area, interception and isolation of the groundwater is very difficult to achieve and maintain in the long term. While measures such as underdrains and sealing layers may be employed, their performance in the long term is questionable. The most effective solution is to select a site which is not located on a groundwater discharge area.

The secure prevention of infiltration, over the long term, is the most difficult to achieve. Covers of different types may be considered.

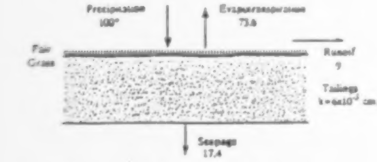
- Soil covers all have a variable but finite permeability. Depending on the nature of the cover, cover slope and precipitation pattern the percentage runoff varies dramatically. Surface slopes which permit ponding considerably increases infiltration. Vegetation increases evapotranspiration but inhibits runoff and may or may not result in a net reduction in infiltration.

  Complex covers (layers of high and low permeability) may be employed to promote drainage, reduce infiltration, facilitate vegetation growth, reduce erosion or resist frost action. Alternative cover designs and their long term stability are reviewed by Steffen, Robertson & Kirsten, 1986a. Some examples are shown in Figure 6.

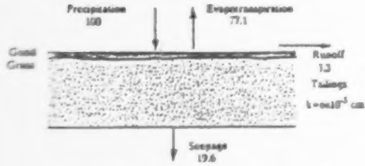
  The Hydrologic Evaluation of Landfill Performance (HELP) program may be used to estimate surface runoff, sub-surface drainage, and seepage that may be expected from a wide variety of cover designs. The results from a number of examples for the acid generating uranium tailings at Elliot Lake, Canada, are illustrated in Figure 6 (Steffen, Robertson and Kirsten, 1987). These examples demonstrate that covers which function as designed would considerably reduce infiltration but that infiltration remains significant for all soil only covers. The HELP model assumes saturated hydraulic conductivity in the various soil layers. Adequate models, to account for partially saturated flow in the layers, have not as yet been developed. The model also makes no allowances for the long term disruption of the covers resulting in local increases in infiltration.


Precipitation
100*
Evaporation
63.5
Runoff
19
Tailings
k=6x10^{-5} cm/s
Seepage
17.5

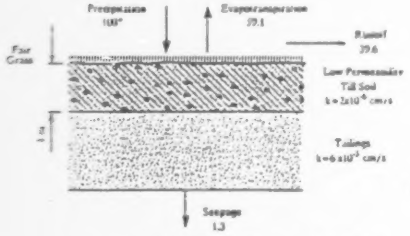
A) No Cover


Precipitation
100*
Evapotranspiration
73.6
Fair Grass
Runoff
9
Tailings
k=6x10^{-5} cm/s
Seepage
17.4

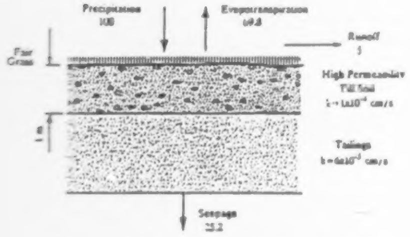
B) Moderate Vegetation Cover


Precipitation
100
Evapotranspiration
77.1
Good Grass
Runoff
3.3
Tailings
k=6x10^{-5} cm/s
Seepage
19.6

C) Good Vegetation Cover

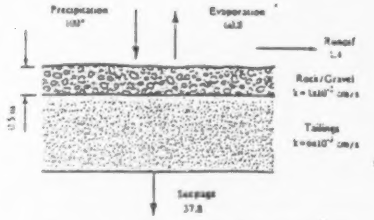

Precipitation
100*
Evapotranspiration
59.1
Runoff
39.6
Fair Grass
Low Permeability
Till Soil
k=2x10^{-6} cm/s
1 m
Tailings
k=6x10^{-5} cm/s
Seepage
1.3

D) Low Permeability Till Soil Cover

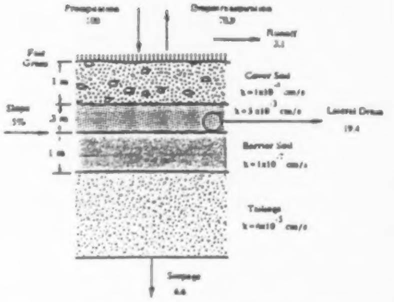

Precipitation
100
Evapotranspiration
69.8
Runoff
5
Fair Grass
High Permeability
Till Soil
k=1x10^{-4} cm/s
1 m
Tailings
k=6x10^{-5} cm/s
Seepage
25.2

E) High Permeability Till Soil Cover

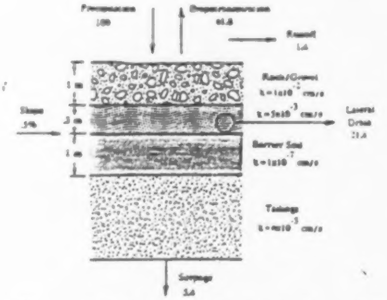
Note: (*) Numbers are percent of total annual precipitation.


Precipitation
100*
Evaporation
60.8
Runoff
1.4
Rock/Gravel
k=1x10^{-2} cm/s
0.5 m
Tailings
k=6x10^{-5} cm/s
Seepage
37.8

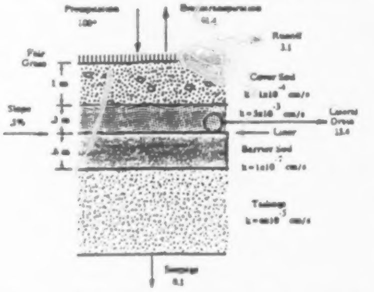
F) Riprap Erosion Resistant Cover


Precipitation
100
Evapotranspiration
70.9
Runoff
3.1
Fair Grass
1 m
Cover Soil
k=1x10^{-4} cm/s
Slope
5%
.3 m
k=5x10^{-3} cm/s
Lateral Drain
19.4
1 m
Barrier Soil
k=1x10^{-7} cm/s
Tailings
k=6x10^{-5} cm/s
Seepage
6.6

G) Soil Barrier with Lateral Drain and Soil Cover


Precipitation
100
Evapotranspiration
61.8
Runoff
1.6
1 m
Rock/Gravel
k=1x10^{-2} cm/s
Slope
.5%
.3 m
k=5x10^{-3} cm/s
Lateral Drain
31.4
1 m
Barrier Soil
k=1x10^{-7} cm/s
Tailings
k=6x10^{-5} cm/s
Seepage
5.6

H) Soil Barrier with Lateral Drain and Riprap Cover


Precipitation
100*
Evapotranspiration
61.4
Runoff
3.1
Fair Grass
1 m
Cover Soil
k=1x10^{-4} cm/s
Slope
.5%
.3 m
k=5x10^{-3} cm/s
Lateral Drain
33.4
Liner
.6 m
Barrier Soil
k=1x10^{-7} cm/s
Tailings
k=6x10^{-5} cm/s
Seepage
0.1

I) Soil Barrier with Synthetic Membrane Liner, Lateral Drain and Soil Cover

Figure 6 Infiltration Barriers for Engineered Cap - Elliot Lake

- Synthetic membrane liner covers, in combination with soil layers can provide extremely effective infiltration controls. This is demonstrated in Figure 6(I) where infiltration is reduced to 0.1% of precipitation.

  The other synthetic covers discussed in the previous section would all serve to achieve substantial reductions in infiltration.

Reductions in infiltration do not necessarily mean equivalent reductions in contaminant loadings in AMD, since the concentrations may increase in the reduced flows. A 75% percent reduction in infiltration may only result in a marginal reduction in contaminant loading. On the other hand the placement of a cover also has other abatement effects due to reductions in air entry and thermal variation control. Reliance on covers for infiltration control requires their continued effective operation, in the long term, as discussed in the next section.

AMD Collection And Treatment

Collection and treatment provides the last defence in AMD abatement. It involves technology which is well established, and is working effectively at a large number of mines. Its main drawback is that collection and treatment must be continued for a very long period in time, while AMD continues.

The risk of failure of any form of treatment system is large. Extreme events such as flooding and fires can prevent treatment operations. Mechanical failure, labour disputes, power loss, reagent supply failure all represent large risks to continued treatment.

Alternative chemical treatment methods are reviewed by Skousen et al, 1987. The primary treatment method currently involves treatment with lime to produce a sludge. The mass of sludge produced exceeds by many times the mass of the sulphides responsible for acid generation. In the long term the volume of sludges may exceed the initial volume of the wastes producing the acid. Disposal of these sludges are an increasing problem. Long term dissolution of these sludges may represent an environmental hazard as great as the initial acid producing waste. Chemical treatment, while it offers a secure short term method of achieving environmental protection, may not offer long term affordable solutions.

Treatment of AMD by wetlands has been demonstrated by a number of workers to be effective (McHerron, 1986, Huntsman, 1985 & 1986, Pesavento and Stark, 1986). For northern climates, concerns exist regarding both the short term continuous effectiveness and the long term maintenance requirements. Biological activity reduces in the winter and water flow in winter is canalized by ice formation. Unless adequate treatment can be maintained all year round it will be necessary to store winter flows for treatment in the summer. The long term fate of metals accumulated in the organic deposits have not been determined. Where feasible, wetlands should be considered as the final polishing step in the treatment of residual AMD, after the implementation of other primary abatement measures.

LONG TERM STABILITY OF CONTROL MEASURES

Waste facilities can usually be designed to adequately achieve the design and abandonment plan objectives at the time of close-out. However, in the long term, the waste deposit and its control structures are subject to two classes of disruptive forces.

1) Short duration extreme events such as floods, fires, earthquakes and tornadoes which apply forces to the structures in excess of values for which they were originally designed.

2) The slow but perpetual action of forces which bring about deterioration, such as water and wind erosion, frost action, the weathering and chemical change of wastes, cover liners or structural materials, and intrusion by roots, animals and man.

Under the action of these forces, failure is inevitable within geologic time. Periodic maintenance can serve to repair the ravages of many of the perpetual forces. For a well designed facility the required interval between maintenance may be decades or centuries, imposing minimal cost on future generations. Remedial measures may be required after extreme events. The level of periodic maintenance and risk of remedial action which may be appropriate to pass on to future generations must be balanced by the present value to society of the resource.

During their evaluation of the long term stability of uranium tailings structures and surfaces, Steffen Robertson and Kirsten (1986a, 1986b), developed a summary of potential causes and associated risk of long term instability of 'generic' Canadian tailings impoundments. The conclusions from these evaluations are summarized in Robertson & Clifton, 1987.

Extreme Events

Because of the long period of interest, the likelihood of extreme events is proportionately large. This likelihood is determined from probability:frequency relationships based on the historical record of events.

The period of record is for an interval in which a particular climate applied. Evidence suggests (McInnis, 1985), that climatic cycles occur regularly, varying from relatively minor 30 year cycles to major glacial and inter glacial cycles of tens to hundreds of thousands of years. The weather in several years, or a few centuries from now is unknown (Hare and Thomas, 1974). While it is questionable whether man has altered world climate to date, the potential for material alteration increases and his influence may rival or overrule natural climatic changes in the early twenty-first century or sooner. While the nature of the changes are unknown, it is certain that the extremes to which the impoundments will be subjected will be greater than that predicted from existing records.

High Precipitation and Floods

Large precipitation events represent one of the most likely causes of waste impoundment failure. Failure during such events are also likely to result in large losses of tailings or waste fines to the environment.

Methods for the estimation of high precipitation events, and for the calculation of the resulting flood flows are well developed for dam design purposes. Current practice is usually to design operating facilities to withstand the one in two hundred year precipitation event. Design for the Probable Maximum Precipitation (PMP) is probably more appropriate for long term conditions.

Earthquakes

Dynamic loads, due to earthquakes, may result in the liquefaction of low density saturated tailings or uncompacted, saturated portions of granular embankments or embankment foundation materials. Failure of the El Cobre tailings dam in Chile, (Dobry and Alvarez. 1967) and Mochi Koshi tailings dam in Japan, (Okusa and Anma, 1980), are ample demonstration. New dams can be designed to appropriate standards. In populated areas, it may be appropriate to design for the long term to cope with the maximum credible earthquake. Methods of earthquake loading probability estimation is well developed for dam design.

Numerous older tailings impoundments have been constructed in a manner which make their embankments susceptible to liquefaction during extreme earthquake events. Abandoned impoundments of this type, if located in an earthquake potential area, may require remedial works to render them stable in the long term.

High Winds and Tornadoes

Tornadoes, tropical cyclones and low pressure systems are sources of high winds. Risk of failure from the last two sources is associated more with the precipitation that accompanies them than from the high winds themselves. Tornadoes, though the most destructive of all winds, are of such a short duration at an impoundment site that they do not have a significant potential of effecting the stability (Kolousek, 1984).

Forest Fires

Forest fires are expected to occur several times in the period of interest. Of themselves, they do not pose a significant threat to waste impoundment stability. However, loss of vegetation cover may lead to accelerated erosion by wind and water.

Perpetual Disruptive Forces

Erosion

Erosion may occur as a result of either wind or water action. Both are potentially severe causes of instability of surfaces and covers.

- Wind Erosion

Wind erosion has been observed to be a major release mechanisms at some existing waste impoundments. Control of this mechanism, for the long term, depends on the successful establishment and maintenance of a wind erosion resistant cover, such as vegetation, waste rock or surface crusting. Methods for the determination of the wind erosion potential and release rates of a particular cover type are reviewed by Steffen Robertson and Kirsten (1986a). They conclude:

1) Unacceptably high wind erosion rates occur on tailings surfaces and soil covers (without gravel) unless a well developed vegetation cover is established. Loss of vegetative cover (due to forest fires, flooding, or salt migration) could result in unacceptably high rates of wind erosion releases.

2) till, with a substantial gravel percentage, and rock waste will form effective wind erosion resistant layers when placed in thin (600 mm) cover layers.

- Water Erosion

This is probably the single most severe cause of impoundment instability. Erosion can take the form of food erosion of the diversion works, or sheet and gully erosion of the impoundment surface and embankment slopes.

I) flood erosion

A substantial portion of total erosion occurs during extreme precipitation and flood events. The probability of failure will depend on the criteria used to design the structure, and the degree of scour, sedimentation and/or blockage which has occurred. Sedimentation, ice, vegetation growth and debris blockage are extremely difficult to avoid in the long term; though easily and inexpensively cleared through maintenance.

Methods for the evaluation of erosion risk, and appropriate methods of design are reviewed in Steffen Robertson and Kirsten (1986a, 1986b). Appropriate control structure design would involve:

1) Design and construction of diversion structures to accommodate the Probable Maximum Flood (PMF) with ample width and size to allow for partial blockage or sedimentation.

2) use of heavy riprap (or waste rock) armouring along flow channels and on adjacent slopes. Methods for erosion protection design are provided in Walters and Skaggs (1984).

ii) sheet and gully erosion

The most suitable methods for the prediction of sheet and rill erosion are the Unified Soil Loss Equation (Wischmeier and Smith, 1978), and Modified Universal Soil Loss Equation (Williams,s 1975). After using these methods for erosion rate estimation, Steffen Robertson dn Kirsten (1986a) concluded that:

1) Tailings and bare soil would result in excessive sheet and rill erosion unless the soil contained a high percentage of coarse gravel.

2) Good grass cover does much to control this type of erosion which becomes insignificant with continuous forest cover.

3) Rock waste and cobble riprap are effective controls.

4) Discontinuous cover or periodic cover loss will result in unacceptable erosion rates.

iii) gully erosion

Gully erosion has been observed to be a major cause of instability of tailings surfaces and embankments. The only available method of gully erosion estimation is that proposed by Falk et al (1985). This method is based on limited data for American climatic conditions, does not account for vegetation cover and is considered invalid for long period estimation. Nevertheless, it has been used to demonstrate that the only effective gully erosion control for gravel free embankments and tailings slopes is riprap. This conclusion is in in agreement with field experience.

- Biotic Activity

i) root penetration

In general root action is considered to have an overall beneficial effect on covers, embankments and other structures in providing a binding effect and resistance to soil erosion, as well as minimizing infiltration. Two possible destabilizing effects have been observed:

1) Roots may penetrate low permeability layers and, on decomposing, provide seepage channels which increases infiltration through covers, or piping in embankments.

2) extensive root development in moist, permeable drains or drainage layers may ultimately result in clogging of the drains, in a manner similar to that experienced with residential drains.

Methods to reduce the potential for drain blockage include ensuring that the drains operate in a flooded condition and use of large drains with surplus drainage void space.

ii) burrowing intrusion

Burrowing intrusion by insects and animals have the potential, in the long term, of significantly altering the permeability of low permeability capping layers.-

Intrusion by man, principally to obtain tailings for use in construction, has proved to be a material transport mechanism at some acid generating waste sites. Vehicle and large animal traffic can also be a major cause of erosion. The prevention of intrusion by man, in the long term, can only be achieved through institutional control and enforcement.

- Frost action

Recent studies and experience regarding frost action in tailings impoundments (Knight and Piesold, 1986; Geocon, 1986; Steffen Robertson and Kirsten, 1987), have demonstrated that the effects of frost on the engineering properties of tailings and their containment structures can be large. In those areas where continuous or discontinuous permafrost develops, and in areas of severe winter cold, frost action may be a major cause of long term instability.

The effects of freezing temperatures on tailings impoundment stability can be divided into two broad groups.

i) annual ice accumulation

Water flow in channels or drains may freeze in successive layers resulting in large accumulations of ice in a single winter, Ice accumulations may result in blockage of the diversion structures or outlet works, with a consequential risk of erosion along the displaced flow channel during the early spring melt. Freezing of drains may result in a build up of pore pressures in embankments resulting in slope failure.

Ice accumulation can and does occur during tailings placement, where tailings are placed onto beaches.

Large consolidation settlements may occur after close-out. Such settlement will affect the drainage pattern on the surface of the impoundment and may result in cracking of any cover layers placed on the tailing.

ii) seasonal frost penetration

Knight and Piesold (1986) found that the effect of freezing low density tailings is to create a lattice work of ice crystal with consolidated tailings in between. The effect on the engineering properties of the tailings, (Robertson, 1987a), is to increase the permeability of the tailings at the same time as increasing the density. Seepage and consolidation rates (after thawing) are therefore increased. Frost susceptible cover materials subjected to freezing will develop ice lenses and a fissured structure which, on thawing, increases the impermeability of the cover. Where the cover is designed to limit infiltration this represents a severe failure mechanism. Frost penetration may also block subsurface drains, preventing drainage and causing pore pressure increases.

With annual accumulations of ice, there is an associate desegregational frost heave. Conditions have been identified where up to 200 mm of heave can occur annually. Steffen Robertson and Kirsten (1987). This seasonal heave is uneven, depending on surface and deposit conditions. Heave, with its consequential effects on drainage, wind and water erosion and cover disturbance, further affects differntial frost heave conditions. The end result is a hummocky, irregular surface with greatly disrupted drainage and cover layers. Small variations in seasonal temperature, snow cover and vegetation cover conditions will materially effect rates of aggradation and degradation of the frost. Frost induced creep (solifluction) also occurs on steeper surfaces such as embankment slopes.

CONTROL TECHNOLOGY FOR PHYSICAL STABILIZATION

Control technology for the physical stabilization of waste facilities control structures and covers are reviewed in Robertson and Clifton, 1987, and described in Steffen, Robertson and Kirsten, 1986a & b and 1987

REFERENCES

Caruccio, F.T. and G. Geidel, G., 1985b, 'nduced Alkaline Recharge Zones to Mitigate Active Acidic Seeps', Final Report to West Virginian Department of Energy, Division of Reclamation, Charlestown, WV.

Caruccio, F.T. and Geidel, G., 1983, 'The Effect of Plastic Liner on Acid Loads/DLM Site', WV. In: Proceedings, Fourth West Virginia Surface Mine Drainage Task Force Symposium, Clarksburg, WV.

Caruccio, F.T. and Geidel, G., 1985a, 'Induced Alkaline Recharge Trenches - an Innovative Method to Abate Acid Mine Drainage'. In: Proceedings, Sixth West Virginia Surface Mine Drainage Task Force Symposium, Morgantown, WV.

Caruccio, F.T. and Geidel, G., 1986, 'Reclamation Strategies as Applied at the DLM Properties'. In: Proceedings, Seventh West Virgina Surface Mine Drainage Task Force Symposium, Morgantown, WV.

Dobry, R. and Alvarez, L., 1967, 'Seismic Failures of Chilean Tailings Dams'. Journal of the Soil Mechanics and Foundations Divisions, ASCE, V. 93, No. SM6, Proc. Paper SS82.

EPA, 1977, 'Palaoenvironment of Coal and Its Relation to Drainage Quality', United States. Environmental Protection Agency Report EPA-600/7-77-067, June.

Falk, J.A., Abt, S.R. and Nelson, J.D., 1985, 'Prediction of Gully Incision on Reclamationed Tailings Slopes', Submitted to the U.S. Nuclear Regulatory Commission, Report No.: CER85-86JAF-SRA-JDN6, pp. 76, September.

Geocon, 1986, 'Consolidation of Uranium Mill Tailings, National Uranium Tailings Program', Department of Energy, Mines and Resources, Canadian Centre for Mineral and Energy Technology.

Halbert, B.E., Scharer, J.M., Knapp, R.A. and Gorber, D.M., 1983, 'Determination of Acid Generation Rates in Pyritic Mine Tailings', 56th Annual Conf. Water Pollution Control Federation, Atlanta.

Hare, F.K. and Thomas, M.K., 1974, 'Climate Canada', Toronto, Wiley.

Hester, K.D. & Associates, 1984, 'Practical Considerations of Pyrite Oxidation Control in Uranium Tailings'. Research Report prepared for National Uranium Tailings Program, CANMET, EMR, Ottawa.

Huntsman, B.C., 1986, 'Sphagnum-Dominated Man-Made Wetlands Used for Acid Mine Drainage Abatement; Preliminary Performance Evaluation'. In: Proceedings, Seventh West Virginia Surface Mine Drainage Task Force Symposium, Morgantown, WV.

Huntsman, B.E., 1985, 'Designed Construction of Man-Made Wetlands for Acid Mine Drainage Abatement', In: Proceedings, Sixth West Virginia Surface Mine Drainage Task Force Symposium, Morgantown, WV.

Knapp, R.A., 1987, 'The Biogeochemistry of Acid Generation in Sulphide Tailings and Waste Rock', Acid Mine Drainage Symposium, Halifax.

Knight and Piesold, 1986, 'Monitoring of Layered Uranium Tailings - Phase II'. Report to National Uranium Tailings Program, Department of Energy, Mines and Resources, Canadian Centre for Mineral and Energy Technology.

Kolousek, V., 1984, 'Wind Effects on Civil Engineering Structures - Studies in Wind Engineering and Industrial Aerodynamics', 2. (Translation of revised, enlarged and updated Czechoslovakian text). Prague, Elsevier.

Lundgren, D.G., 1971, 'Inorganic Sulphur Oxidation by Iron-Oxidizing Bacteria'. Syracuse Univ. Publ. No. 14010 DAY. US Envi. Protec. Agency, Washington.

Lundgren, D.G. et al, 1972, 'The Microbiology of Mine Drainage Pollution' - In Water Pollution Microbiology, Ed. R. Mitchel. Wiley-Interscience.

McHerron, L.E., 1986, 'Removal of Iron and Manganese from Mine Drainge by a Wetland:Seasonal Effects'. MS Thesis. The Pennsylvanian State University, State College, PA.

McInnis, P., 1985, 'Literature Review for the National Uranium Tailings Program (NUTP) - Long Term Effects of Natural Events on Uranium Tailings Impoundments.' Prepared for Department of Energy, Mines and Resources, Canadian Centre for Mineral and Energy Technology. National Uranium Tailings Program. NUTP 85-3(TR).

Okusa, S. and Anma, S., 1980, 'Slope Failures and Tailings Dam Damage in the 1978 Izu-Ohshima-Kinkai Earthquake.' Engineering Geology, V. 16, pp. 195-224.

Pesavento, B.G. and Stark, L.R., 1986, 'Utilization of Wetlands and Some Aspects of Aqueous Conditions'. In: Proceedings, Seventh West Virginia Surface Mine Drainage Task Force Symposium, Morgantown, WV.

Robertson, A. MacG. 1987a, 'The Influence of Depositional Methods on the Engineering Properties of Tailings Deposits'. Int. Conf. on Mining and Industrial Waste Management. Johannesburg, South Africa, August.

Robertson, A. MacG. and Clifton, A.W., 'Design Considerations for the Long Term Containment of Tailings'. Proc. Canadian Geotechnical Conference, Regina. 1987.

Robertson, A. MacG., 1987, 'Alternative Acid Mine Drainage Abatement Measures'. Proc. B.C. Mine Land Reclamation Conference, Campbell River, B.C., 1987.

Senes Consultants Ltd. and Beak Consultants Ltd. 1986, 'Estimation of the Limits of Acid Generation by Bacterially-Assisted Oxidation in Uranium Mill Tailings', National Uranium Tailings Program, CANMET, Ottawa.

Silker, W.B. and Kalkwarf, D.R., 1983, 'Radon Diffusion in Candidate Soils for Covering Uranium Mill Tailings', Pacific Northwest Laboratory Report PNL - 4434. NUREG?CR-2924.

Skousen J.G., Sencindiver, J.C. and Smith, R.M., 1987 'A Review of Procedures for Surface Mining and Reclamation in Areas with Acid-Producing Potential Materials'. Publication in Cooperation with The West Virginia Surface Mine Drainage Task Force.

Sobek, A., 1987, 'The Use of Surfactants to Prevent AMD in Coal Refuse and Base Metal Waste', Acid Mine Drainage Symposium, Halifax, March.

Steffen Robertson & Kirsten, 1986a, Report 58901, 'The Technology of Uranium Tailings Covers' DSS Report #15 SQ. 23241-5-1709. National Uranium Tailings Program, Department of Energy Mines and Resources, Canadian Centre for Mineral and Energy Technology.

Steffen Robertson and Kirsten (B.C.) Inc., 1986b, 'The Stability of Control strucutres ofr Uranium Mill Tailings', DSS Report 15SQ.23241-5-1715. National Uranium Tailings Program, Department of Energy Mines and Resources, Canadian Centre for Mineral and Energy Technology.

Steffen Robertson and Kirsten, 1986c, 'Studies Relating to Evaluation of Altenraitve Abandonment Measures for Faro Mine Tailings;, Report 60601 to Curragh Resources.

Steffen, Robertson and Kirsten, 1986a, 'The Technology of Uranium Tailings Covers', Research Report Prepared for National Uranium Tailings Program, CANMET, EMR, Ottawa.

Steffen, Robertson and Kirsten, 1987. 'Canadian Uranium Mill Waste Technology'. Publication for National Uranium Tailings Program, by CANMET, Energy Mines and Resources Canada.

Walters, W.H. and Skaggs, R.L., 1984, 'Effects of Hydrologic Variables on Rock Riprap Design of Uranium Tailings Impoundments', Pacific Northwest Laboratory Report NUREG/CR-3752, PNL-5069, U.S. Nuclear Regulatory Commission, Washington, D.C.

Williams, J.R., 1975, 'Sediment Routing for Agricultural Wastes', Water Resources Bulletin 1195):965-1974.

Wischmeier, W.H. and Smith, D.D., 1978, 'Predicting Rainfall Erosion Losses - A Guide to Conservation Planning', USDA Handbook 537.

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Miners try to evict birds from cyanide ponds

By Doug McMillan/Gazette-Journal

More than 6,400 waterfowl and shorebirds have died in cyanide-laced tailings ponds at Nevada's gold mines in the past three years, a top Nevada wildlife official said Saturday.

But Bob McQuivey, chief of the Habitat Division of the Nevada Department of Wildlife, speaking at a mining reclamation conference in Reno Saturday, said wildlife biologists and mining operators are finding ways to stop the carnage.

After Nevada's latter-day gold mining boom started in the early '80s, wildlife officials began hearing reports of birds dying by the hundreds at several Nevada mines, McQuivey said. They were preparing to arm themselves with search warrants to enter the mines themselves when someone asked, "Why not talk to the mining people," he said.

They found the industry was as worried about the deaths as game wardens, not only because of the bad publicity they feared, but because many miners are hunters and "dead birds don't go through water pumps very well," he quipped.

What followed was an extensive monitoring program in which mines voluntarily reported wildlife deaths and obtained permits from the Department of Wildlife, even though no Nevada law required them to do so.

Gold and silver mines use cyanide, a highly toxic chemical, to dissolve their ore, precipitating or filtering the precious metals from the resulting solutions. Some sprinkle it over mounds of ore in a process called heap leaching. Others run it through ore-crushing mills, emptying the spent cyanide solution into huge tailings ponds. Many use both processes for different grades or types of ore.

Tailings ponds are the primary culprit. Migrating birds, spotting new, inviting-looking ponds in the desert, land for rest and food and quickly expire from the poison.

Three problem mines have accounted for nearly two-thirds of the bird kills, McQuivey noted: FMC Corp.'s Paradise Peak gold mine south of Gabbs, where the problem first showed up, BP Minerals' Alligator Ridge gold mine, 70 miles northwest of Ely, and NERCO Minerals' Candelaria silver mine, 50 miles south of Hawthorne.

All three have large ponds with high concentrations of cyanide.

Paradise Peak has recorded more than 1,600 dead birds; Alligator Ridge, 1,459, and Candelaria, more than 600.

The operators and wildlife officials first tried numerous "hazing techniques," trying to scare the birds away with retorting canons, siren-like alarms, fluttering flags and streamers and even playing heavy-metal rock music.

They also tried dying the water orange and red, colors which supposedly repel waterfowl.

But the two methods that work the best are stretching mammoth nets over the ponds or neutralizing the cyanide with other chemicals — both expensive propositions.

Paradise Peak has used netting while Alligator Ridge and Candelaria have neutralized their solutions.

At the same time Nevada mines were struggling with the problem, Cyprus Minerals' new gold mine at Quartzite, Ariz., distressed the Yuma chapter of the Audubon Society by killing more than 900 birds.

Cyprus environmental coordinator Dan Robertson said that no sooner had the mine repelled ducks with flags and a warning alarm that was supposed to simulate a distress signal, than wading birds and seagulls began to swoop down and die on the mine's two ponds.

Robertson gave an inkling of the cost of wildlife protection when he told the mining conference that the estimate to cover the ponds with netting was $2.6 million.

Cyprus came up with the idea of building a separate freshwater pond to lure birds away from the toxic cyanide ponds.

"Our ore is red," which ducks don't find attractive, he said. "We thought with flagging, propane canons and World War III going on at our two cyanide cells, birds would find the alternative pond a nice place to stop and rest."

But the Bureau of Land Management rejected the idea as unproven.

Instead, Cyprus has resorted to neutralization, which will cost about $3 million per year. Chemicals to neutralize the cyanide are costing $200,000 to $250,000 per month while the company is spending about $12,000 per month to buy extra cyanide. Most mines recycle the cyanide from the ponds, but that's impossible when it's neutralized.

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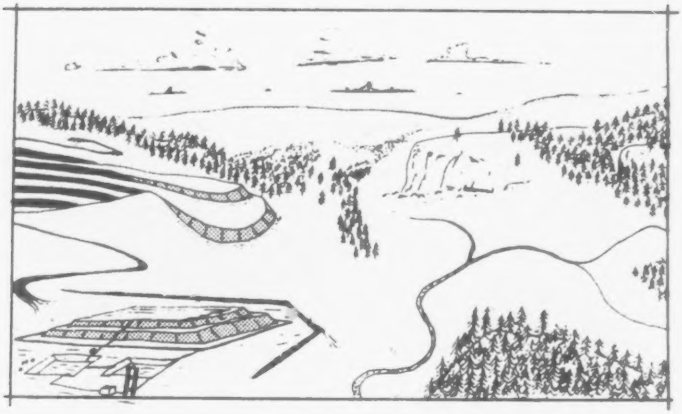

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INTRODUCTION

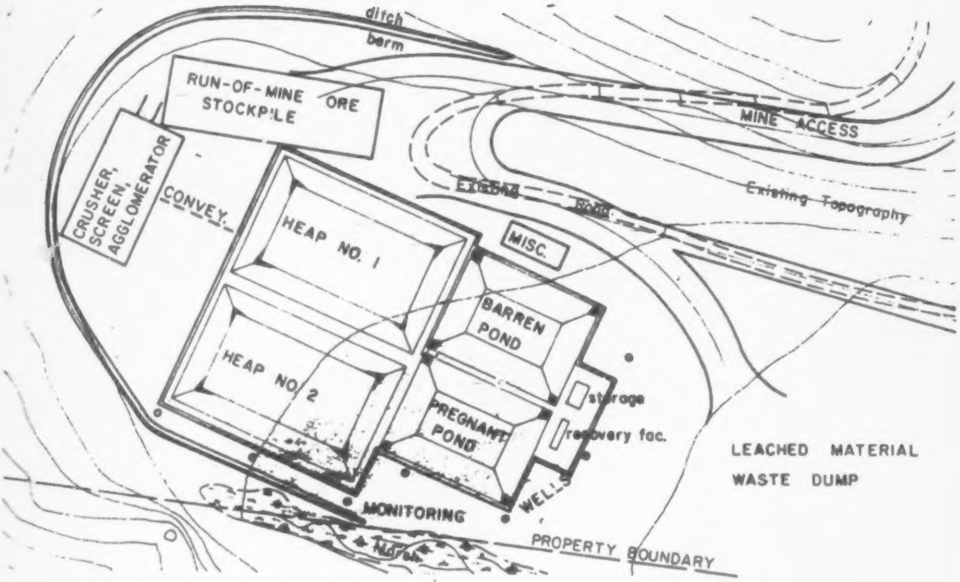
Setting aside areas for conserving and preserving their scenery, wildlife, and natural, cultural, and historical features has been accomplished through the National Park System. ~~However, enabling legislation for most units of the system does not provide for preventing mineral activities and, in some instances, specifically allows for the continued exercise of valid existing rights.~~ Developing these mineral rights has some effect on the resources of a park unit. Park units are subject to the influences and effects of not only those mineral activities within their boundaries, but also those that occur outside their boundaries.

In past decades, a dramatic increase has occurred in the knowledge and use of cyanide for processing material containing low concentrations of gold and silver. The success of operators using this technology has contributed to an increase in exploring and developing properties with mineral deposits amenable to cyanide leaching. The lower costs associated with cyanide operations not only enable the exploiting of low-grade mineral deposits, but also allow waste dumps from old mines and tailings dumps from old mills to be economically processed. The use of cyanide has traditionally been limited to treating lode deposits; however, some placer operations have recently incorporated cyanide leaching as a means of gold recovery.

Only one park currently has an approved plan for a cyanide leaching operation within its boundaries. Gold activities in about 10 other park units consist mainly of placer mining and exploration work. Approximately ten additional units have the potential for gold development activities within their boundaries. Several parks are known to contain abandoned cyanide operations within their boundaries, but the actual number of parks or sites is not known. Six parks have active or proposed cyanide leaching operations adjacent to their boundaries, and another twenty-four park units have the potential for some type of gold development activity adjacent to their boundaries.

Because units of the National Park System are subject to the environmental effects and influences of cyanide leaching operations from within and outside their boundaries, a knowledge of cyanide and cyanide operations and of how to deal with potential problems is important for park resource personnel. This knowledge will also enable park staff to effectively deal with abandoned cyanide operations.

Guide
to
Reviewing and Assessing
Proposed Cyanide Leaching Projects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LEACHED MATERIAL WASTE DUMP
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GUIDE TO REVIEWING AND ASSESSING PROPOSED CYANIDE LEACHING PROJECTS

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United States Department of the Interior

May 1987

The National Park Service
GUIDE
TO
REVIEWING AND ASSESSING PROPOSED CYANIDE LEACHING PROJECTS

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INTRODUCTION

Part I of the manual provides detailed guidance to assist in the review process of a proposed plan for a cyanide leaching operation. Discussions of the exploration for mineral deposits, excavation of ore, haulage of ore, general access to and from the mine and milling site and other aspects of a mineral operation that are common to many or all mineral development activities are not included. The requirements of a proposed plan of operations as outlined in the regulations governing mining within units of the National Park System, 36 CFR Part 9A, are also not discussed except in those instances that such discussion is of import and consequence to cyanide operations. A brief discussion of National Park Service regulations is provided in PART II; however, a more detailed presentation is made in "GUIDE TO NATIONAL PARK SERVICE REGULATIONS GOVERNING MINING AND MINING CLAIMS." References are provided throughout this section to applicable sections in PARTS II and III for further information and detailed discussion on various subjects or topics.

1

INITIAL REVIEW

The initial review consists of examining the proposed plan of operations for completeness and acceptability. The reviewer inspects the submitted plan to ensure that the operator has included the necessary sections, maps, permits, reports, and contingency plans that are required to adequately analyze the actual and potential impacts, analyze measures to prevent or limit impacts, and determine if resource impacts are acceptable or if an environmental impact statement is required. Because proposed plans of operations come in various formats, close examination will be necessary to ensure completeness. For example, the decommissioning of the heap and final reclamation may be discussed together in one section or may be addressed separately; safety plans, security plans, emergency response plans, and plans for detoxification or spill containment may all be discussed separately or together; and hydrologic investigations may be discussed with monitoring programs.

The following list presents the required elements of a plan, followed by information that may or should be included. Failure of the operator to address any of these items will result in rejecting the proposed plan, unless the operator can provide the necessary data or information.

1) Access - The exact route of transporting cyanide and other chemicals and the mode of transport, such as air, water, or road, must be described or discussed and depicted on a map.

2) Site Layout - Maps and cross sections depicting buildings, storage and staging areas, pads, ponds, tailings impoundments, monitoring and leak detection systems, drainage control, heap configuration, area topography, and property boundaries are important in analyzing real and potential impacts and mitigative measures.

3) Pads and Ponds - This discussion should include the design and construction of pads, heaps, and ponds. Maps and cross sections should be included that accurately illustrate the configuration and manner of design and construction of these critical items.

4) Water Balance - Water balance must be discussed by the operator and the computations showing how the balance is achieved should also be submitted. The components considered should include start-up and make-up water requirements, reagent addition requirements, bleed-off or discharge requirements, precipitation and runoff, evaporation, clean water rinse, pond sizing and volume.

5) Drainage Control Plan - The design, construction and flow capacity of diversion ditches and berms, and a peak flow analysis of major precipitation event must be provided by the operator.

6) Chemical Storage and Handling - The types and amounts of chemicals that will be stored on-site, method of storage, movement of chemicals to ponds or heaps, and container disposal must be discussed.

7) Safety and Security Precautions - Methods of securing the area for public and wildlife safety must be incorporated into the proposal, including fencing, gating, posting, and, possibly, an on-site watchman.

8) Geologic and Hydrologic Investigations - The geology and hydrology of the site and vicinity that includes

such information as rock and soil type, depth to bedrock, faults and fractures, level of water table, direction and rate of surface and subsurface water flow and water quality must be provided. Maps and cross sections should be included to illustrate the geology and hydrology and facilitate the review process.

9) Geotechnical Investigation - An engineering investigation of the proposed site for the leaching operation should be required. This investigation will study the foundation conditions, the pad, liner, heap and ponds and how these structures react under conditions of stress, such as material loading, material saturation, water impoundment, and seismic activity.

10) Biological Investigation - A detailed investigation of birds, animals, fish, and plants may be required to identify those species that are sensitive to cyanide, heavy metals, and other toxic substances that may be released during a spill or leak in order to determine potential impacts.

11) Monitoring and Leak Detection Program - The operator must have a program for obtaining baseline data, for establishing a system enabling the timely detection of leaks and providing for surface and subsurface water sampling during operations. Frequency of inspection and sampling, location of sampling points, and parameters to be analyzed must be included.

12) Accident Response and Contingency Plans - The operator must provide a plan detailing how spills at the site and along the transportation route and leaks in pad or pond liners will be responded to, including such remedial actions as detoxification and cleanup.

13) Decommissioning and Reclamation-Procedures or steps to be taken at the end of operations to provide adequate reclamation and long term site integrity must be included in the proposal. Such steps may include heap rinsing, detoxification of free cyanide, grading, sealing, compaction, capping with soil and revegetation.

14) Post-Reclamation Monitoring Plan - A monitoring program should be included that will identify problems resulting from inadequate decommissioning and reclamation practices. Such a program may include surface and ground-water monitoring, length of program, and a response and remedial action plan in the event problems occur.

ACCESS

An accident resulting in a spill can have severe environmental consequences; therefore, the manner and route of access through the park by which chemicals are transported must be given consideration. Other information required to assess potential impacts includes amount of chemicals hauled per trip, number of trips per year or season, and timing of trips. An accident response and contingency plan (herein referred to as ARCP) may be incorporated by the operator into this topic or may be located in another section of the proposal. The transportation of chemicals may fall under the Hazardous Materials Transportation Act which is discussed further in PART II.

The manner and route of access through the park (air transport over inaccessible areas, ground transport, transport across water, or wildlife migration routes, etc.) will have a direct effect on the potential impacts if an accident were to occur. The ARCP is also directly related to or dependent on the manner and route of access. The type and volume of chemicals hauled per trip must be known in order to assess the potential severity of impacts in case of an accident and spill and to assess the adequacy of the ARCP. Timing and total number of trips each year will assist in the assessment of potential and actual impacts on park visitors and plant and animal populations. The plan must identify how an accident will be handled (e.g., detoxification or removal of contaminated soils, access to the site if transport was by air, and the response time).

In reviewing proposed access, consideration should be given to changes in various aspects of the transport of the chemicals through park lands to mitigate potential environmental impacts. If it is desired to alter an aspect of access, the overall effect on access and potential impacts must be taken into consideration (e.g., limiting the volume hauled each trip will require more trips and altering the route of transport may increase the accident response time). Changes may have subtle effects that are negligible when considered alone and, thus, are easily overlooked, but when considered together may be very important.

SITE LAYOUT

Accurate maps depicting existing conditions and features in relation to each element of the proposed leaching project must be submitted by the operator. These maps should include contours that accurately depict topography (a 2-foot contour interval is recommended and in no case should it be greater than 5 feet); ponds, creeks, springs, and other natural drainage features; man-made structures and features, such as buildings, storage and staging areas, pads, ponds, and tailings impoundments; monitoring and leak detection systems; ditches and drainage control structures; and mining claim, mill site, or property boundaries. The proposal should also be further illustrated by cross sections depicting both man-made structures (e.g., earthen dams, berms and cut-and-fill areas), as well as the geology and hydrology of the site. Maps and cross sections can be critical in identifying real and potential impacts, assessing the adequacy of measures taken to limit or prevent adverse impacts, and determining additional mitigative steps.

The layout of the operation should be such that a minimum total area is involved. All activities must be confined to the property. Pads and ponds should be as small in size as possible, with berms constructed immediately around these to minimize precipitation and runoff on and into the pad and ponds. Critical structures and chemical storage areas must be protected from potential flooding by diversion berms and ditches. Chemical storage areas should be situated so that a minimal handling and hauling of chemicals is required. The lining of as much of the area as practical where chemicals and solutions may spill or leak should be accomplished to prevent or minimize the chance of surface and subsurface contamination. Areas that are lined should be situated upslope of the ponds to allow spilled or leaked solution to drain into the ponds. The leak detection and monitoring systems should be placed in a manner that will identify problems as soon as possible and provide ample opportunity to take remedial action.

Aspects of the cross-sections that should be examined include: slopes of berms, ponds, heaps, pads and foundations; the relationship of critical structures (i.e., ponds, heaps, pads) to cut and fill areas and the underlying geology and hydrology; the relationship and adequacy of monitoring wells to bedrock, false bedrock, subsurface water flow or the water table; foundation, liner and pad construction; and the location of leak detection systems in relation to liners, pads and ponds.

Measures to prevent or limit potential environmental impacts must be incorporated into the design of a leaching operation before constructing the facilities. Once construction has been completed, precautionary measures may not be possible to achieve or build into the system, thereby greatly increasing the potential for environmental impact and resource degradation.

PADS AND PONDS

The design and construction of the pad on which the ore is placed should be such that adequate protection from leakage is ensured and ample warning is provided in the case of a leak. The prevention of leakage is also a critical item to the operator, as the cyanide solution will contain the valuable minerals that are to be recovered in the processing plant. It is in the operator's best interest, as well as the National Park Service's, to know when a leak occurs.

Double lining of the pad must be given serious consideration and should be required in most, if not all, instances. In the event that the top liner is breached by the solution, the second liner will prevent subsurface contamination as well as save the loss of the valuable solution. For the operator it would be more cost-effective to install a double-liner than shutting down to fix a leak. Requiring the installation of a double-liner for the pad can be justified when considering the detrimental consequences of a leak.

Another factor involved in pad construction directly involves the placement and leaching of the ore on the pad itself. There is potential for ponds to form on top of the heap and for runoff to occur from the top of the heap during solution sprinkling or rainfall events. This runoff can cause material to erode from the heap onto the pad, extending the slope and edge of the heap out past the edge of the pad. This can result in solution running off the lined pad area, contaminating surface and subsurface soils and water. This type of problem can be solved by the operator ensuring that the material placed in the heap does not contain a large amount of fine particles that would prevent or inhibit infiltration of solution or water and that a proper solution application rate is maintained. Additional measures include constructing small berms on top of the heap along the outer edges to contain solution or rain if the infiltration rate is slow and constructing lined berms along the outer edges of the pad. This latter measure not only ensures the retention of solution, intercepted rainfall, and eroded material, but also reduces the area that will intercept rainfall and runoff.

Wind can also affect pad design. Strong prevailing winds in one direction can necessitate extending the pad in that direction to collect wind blown solution and prevent contamination. Areas subject to strong wind storms and gusts may require shutting down sprinkling operations during these periods.

The pad design should also contain a leak detection system. Further discussion on such systems is presented in the "Contaminant Detection and Contingency Programs" section of this part.

The same design considerations applicable to pads, as previously discussed, also apply to ponds that contain solutions. Double-liners in ponds are considered more critical than for pads by some heap leaching experts, because of the hydraulic head that is created by the solution. This higher pressure would increase the fluid loss rate if a leak were to occur, especially in ponds designed for small surface area exposure (increased pond depth).

It is common practice to situate the solution ponds immediately adjacent to the heap and extend the liner from the heap to the ponds, in effect creating one large lined area. There may be circumstances, however, when this is not possible. Solutions flowing between the heap and the ponds may require movement via ditches and/or pipes. Not only should ditches be properly lined, but the route of any pipeline should be lined. This also pertains to the pipelines that transport solutions to and from the recovery plant and to the site of the recovery plant itself. These lined areas should be properly sloped and banked on the outside to ensure that solution spilled or leaked or solution formed during rainfall onto contaminated soils will flow to the pad or ponds where they will be contained.

The method and manner of construction, placement of ore and the conduct of operations must be such that liner integrity is maintained. Other aspects of pad and pond design and construction are discussed in later sections.

WATER BALANCE

Water balance is the process by which leaching operations are designed to limit or eliminate spillage or solution releases during flood events or wet periods; to ensure adequate water supply, and to minimize erosion damage and allow for season-related aspects of operations, such as winter shutdown and spring snowmelt. Factors that must be taken into account include start-up solution, make-up solution, heap saturation requirements, heap solution retainage, precipitation, runoff, snowmelt, evaporation, reagent addition, bleed-off or discharge requirements, recovery plant storage, and clean water rinse. Each of these will have an effect on the volume of solution within the process circuit during operations or at the end of operations. This in turn will determine or affect the sizing of the ponds.

The volume of start-up solution required will depend on the volume of solution required to obtain heap saturation and the volume of working solution or volume that must be in the ponds to ensure the proper operation of pumps. Make-up solution will be added when the volume must be increased due to losses from evaporation, bleed-off or discharge or when new ore is added to the heap. Liquid reagents added to the solution to control various parameters of the solution (e.g., pH) also add to the total volume of the solution.

Rainfall within the area that drains on and into the pads and ponds can add appreciably to the total volume of solution. These events can occur as short-term, intense rainfall, or extended wet periods. Locations that are subject to thunderstorms or cloudbursts should have this type of event incorporated into the design of the facility. Areas subject to occasional intense rainfalls and where the net precipitation is greater than the net evaporation should use a combination of a storm event and net precipitation to design pond storage capacity. In areas characterized by extended wet periods or wet seasons, the maximum precipitation that could be anticipated for that period should be incorporated into the design. It is recommended that the short-term, high intensity event used be based on a 100-year, 24-hour storm.

Generally, rainfall datum will not exist on a site-specific basis. The National Oceanic and Atmospheric Administration has generated regional maps of various types of rainfall and storm data through statistical analyses. State climatologists will also have daily, monthly, and yearly data on specific rain gauges or stations. Information from these two sources can be complemented with data from gauges the park may have established and with data from gauges that may have been established by local offices of other federal agencies, such as the U.S. Forest Service and the Bureau of Land Management, state agencies, and private organizations. This information may require adjustment or compensation for local conditions that are known to have an influence on rainfall, such as in the Basin and Range Province where mountains receive more rainfall than valleys.

Operations in areas receiving significant accumulations of snow usually shut down during the winter months. The ponds must be able to handle the water when this snow melts, as well as any rain that may fall during the spring melt. Heaps and pads may be covered with plastic, and the snowmelt will not become contaminated, allowing it to be diverted away from the ponds without being retained or requiring a discharge permit.

Ponds must be designed to handle not only the total cyanide solution being used in the leaching circuit and the runoff from precipitation and snowmelt, but must be able to contain the solution retained or stored within the recovery plant circuit and the rinse water. The recovery plant will contain solution within its system which must be drained before seasonal or permanent closure of the operation. The water used to rinse a heap will become contaminated and require containment. The freshwater rinse will present the largest problem due to the inability to accurately estimate the volume of water required to flush the heap of contaminants. A minimum volume would be that equal to the estimated volume required to saturate the heap; however, the actual volume will generally be much greater.

Ditches or pipe systems used to transport the solution from the heap to the ponds must also be designed to handle the precipitation or runoff that may occur. Water balance is further discussed in PART III under "System Design and Construction Guidelines." The operator should submit computations of water volumes for the precipitation event and the ponds.

The discharge of excess solution may be required after rainfalls or snowmelt in order to reduce the levels in the ponds and to keep the volume of solution at a manageable level. Bleed-off or discharge may be necessary to allow the addition of fresh solution when dissolved solids, metals, salts, and other elements reduce water quality to a point where gold and silver dissolution is inhibited or scaling occurs in pipelines and on sprinklers. These volumes should be estimated by the operator, which will allow an assessment of the environmental consequences. Regulations governing the discharge of pollutants are discussed in PART II under the "Clean Water Act." The National Park Service should require copies of discharge permits and copies of any chemical analyses.

An additional factor that will affect the determination of pond volumes is the amount of settleable solids that will be transported to the ponds by the solution. This is another item that is difficult to determine and can vary from negligible to significant amounts, depending on rock type and rock characteristics, ore crushing, and agglomeration.

DRAINAGE CONTROL PLAN

The drainage control plan should show how the operator intends to divert drainages around or away from the proposed operation. The area to be protected must include not only the heap, pad, and ponds but also the site where all chemicals are to be stored, the recovery plant, and any solution pipelines and ditches. Maps, cross sections, and written text should illustrate and describe the size and shape of the structures and the flow capacity of the ditches and berms. The design characteristics of the diversion structures should account for a 100-year, 1-hour storm, and limit damage from erosion.

Internal site drainage control consists of constructing small berms around the leach pad, ponds, solution ditches, and recovery plant. This limits the volume of runoff intercepted by these areas to that which falls directly onto these areas. These berms also ensure solution containment during operations.

Diversions must be designed to handle runoff from precipitation events and snowmelt. The discussion in the preceding section on "Water Balance" concerning rainfall and snowmelt are applicable to this subject also. A peak flow analysis for each channel to be diverted should be included by the operator to illustrate the sufficiency of the drainage control structures. Diversions are discussed in PART III under "System Design and Construction Guidelines."

CHEMICAL STORAGE AND HANDLING

As discussed in PART II, standards for storing and handling chemicals used in mining operations have been established. PART III of this manual contains an E.I. du Pont de Nemours & Co. (Inc.) brochure providing further details on the storage and handling of sodium cyanide. Items that should be incorporated into a proposal include protecting storage areas from flooding, minimizing the length of the haul of cyanide to the solution ponds, and minimizing the distance to the storage site of other chemicals to be used during operations (e.g., pH control and neutralizing agents). A complete description of the type of chemicals to be used and stored on-site, where and how they are to be stored, and how they are to be transported should be provided by the operator. Empty chemical containers must be properly disposed of. Rinsing of containers to remove residual chemicals must be performed where the rinsate is confined by a liner-protected area. Allowing the rinsate to be discharged will require that the operator conform to other laws and regulations and pollutant discharge (hazardous waste, PART II).

SAFETY AND SECURITY PRECAUTIONS

The operator must include steps or measures to ensure the safety and protection of park visitors and wildlife. Such steps may include constructing a gate on the access road to the site, constructing a fence, posting notices on the fence, and providing locks for all gates. Storage of all chemicals inside a structure or building with a locked door would provide further precaution. At sites where workers commute from a nearby community and operations have periods of inactivity or shut down over night, an on-site watchman or caretaker may be desirable. An administrative closure of a small area immediately surrounding a leaching and mining operation to public or visitor use is an additional option to the park superintendent. Such an action can be taken by the superintendent with the requirement that the operator post a notice, prepared by the park, at the site and along the access road. Consideration should also be given to installing or constructing freshwater sources to minimize or lessen the attraction of the cyanide bearing waters to wildlife. Placing netting over ponds can also reduce wildlife mortality, especially waterfowl.

VAT LEACHING

Although most new cyanide leaching projects are heap leaching operations, a brief mention of vat leaching processes is presented because there is a potential for this type of cyanide leaching operation to occur in or near park units. A description of vat leaching operations is presented in PART III under "Cyanide Leaching Operations." Many of the considerations presented in PART I of the manual talk specifically about heap leaching; however, they can easily be applied to vat leaching. Such items include lining the area under the vats, pipelines, and the processing plant; site protection from flooding; and safe chemical storage and handling.

The major problem encountered with vat leaching involves the disposal of the material after it has undergone cyanidation. The impoundments within which the leached materials, or tailings, are placed are generally designed and constructed in a manner that allows drainage of moisture from the tailings. During operations, the impoundment is also used to hold bleed-off or discharged solution and at the end of operations, the remaining solution is discharged into this area. Tailings dams that allow drainage of solution are designed to allow a controlled rate of seepage that will meet water discharge standards. A capping of impermeable material may or may not be placed over the waste at the end of operations, depending on whether or not it is desirable to prevent further percolation of waters through the mass. Allowing the drainage of the tailings provides a much more stable mass over a much longer period of time. The design features of tailings impoundments can be widely varied depending on local conditions; however, this subject is a highly complicated and technical aspect of engineering. Because of the problems inherent to these earthen structures and the material they are designed to hold, the assistance of qualified professionals should be sought when dealing with such operations.

GEOLOGIC AND HYDROLOGIC INVESTIGATIONS

The detail or extent to which geologic and hydrologic investigations are taken will depend on the size of the project and the environmental setting of the operation. Highly complex studies for small operations will generally not be necessary while for large operations such studies may be required. The large versus small criteria, however, should not be used solely in defining the extent of the studies involved. Other defining criteria will include whether or not the operation lies in, immediately adjacent to, or up stream of an area that is of critical habitat to certain fish, wildlife, or plants and whether or not there is a potential for important water sources to be affected.

The geology and hydrology of an area will affect the location and placement of up-stream or up-gradient and down-stream or down-gradient monitoring points or wells. Geology can have an important effect on hydrology, and the pre-operation water quality sampling will provide base data for comparison purposes during and after operations.

GEOTECHNICAL INVESTIGATIONS

The need for an extensive geotechnical investigation of a proposed operation will be influenced by many factors. Each factor alone may not indicate a need for a detailed study; however two or more factors considered together may be sufficient reason to require a geotechnical analysis. The content of the investigation will depend on local conditions and certain aspects of the proposal (area topography, cut-and-fill requirements for site preparation, level of the water table, geologic and soil conditions, and the seismicity or seismic history of the area). Each condition or aspect identified will present potential problems of varying degrees. These should be discussed in the report and the manner or method in which they can or will be dealt with should be presented. If the operator feels that the potential threat from a specific item is insignificant, this may be stated. The reasoning for such a determination may not be presented or may not be clear or apparent to the reviewer of the proposal. A statement outlining the reasons or providing further clarification should be requested.

The topography of an area may dictate that an area, or several areas, must be excavated and/or filled in. Areas where material has been removed may have high banks with potential stability programs. Areas comprised of fill material also pose such stability questions as differential settling over time, differential compaction during loading, erosion of the fill, material movement due to steep slopes or slumping, and mass movement due to saturation by rainfall. In order to minimize or avoid cut-and-fill site work, the operator may propose a "steep-sloping" pad. Pads constructed at a 10 percent or greater slope are considered steep by many experts and may dictate the need for a geotechnical report. A high water table can present structural stability problems by increasing chances for soil movement when a heavy load is placed on the saturated soil. Subsurface geologic and soil conditions can pose problems even when a high water table is not present. Heap leaching operations are usually placed at sites requiring minimal site preparation, such as relatively flat areas consisting of unconsolidated alluvium. Settling or compaction problems can occur in such material. Some soils contain clays or other materials that exhibit expansion characteristics during rainfall events and subsequent contraction as they dry out. An area that is subject to earthquake activity presents additional concerns of the stability of critical structures at a leaching operation. The frequency and magnitude of the seismic activity and the susceptibility of the area to ground movement will dictate the need for a geotechnical report. A tailings impoundment for a vat leaching operation will always require that an investigation be performed.

A geotechnical investigation should not be required for a large operation solely because it is going to be large and the opposite holds true for small operations. Conditions described in the preceding paragraph, taken independently or together, will dictate the need for a report.

BIOLOGICAL INVESTIGATIONS

In theory, the environmental report required by 36 CFR Part 9A should make a biological investigation unnecessary. However, there may be circumstances that dictate the need for a much more detailed investigation of the biological resources of an area. Such a study should identify birds, fish, animals, and plants that are or may be sensitive to cyanide, heavy metals, and other toxic substances that may be released during a spill or leak. The distribution of these various species should be determined. This detailed investigation should not be limited to only the area of the operation, but also include the route used during the transportation of the chemicals to the leaching site and areas down-wind and down-slope or down-gradient where contamination might spread.

A spill or leak into a small lake, pond, or small stream can have drastic consequences on the aquatic life. Contamination of water in a stream would be nearly impossible to treat, because of the continuous movement of the contaminants. Eventual dilution of the contaminants would occur until a point is reached where aquatic life would not be affected; however, miles of stream may be affected. Contamination of a small lake or pond is another matter. The contaminants would eventually dilute and undergo natural degradation and aquatic life would return. However, the time-frame may be decades and the area may not ever return to a normal state. Chemically treating the waters may be possible to eliminate the contaminants, but the damage would have been done and the problem could even be compounded by the addition of the other chemicals.

Terrestrial life has a much higher tolerance to cyanide and other potential contaminants than aquatic life; however, critical habitat, watering holes, and migratory routes may be involved and require further investigation. In arid climates, solution ponds have been known to attract wildlife looking for water sources, especially migratory waterfowl.

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CONTAMINANT DETECTION AND CONTINGENCY PROGRAMS

There is always the potential for problems to occur that could result in the contamination of soils and waters due to construction errors, oversights, or other unpredictable circumstances. The ability to identify and deal with such problems can only be adequately and expeditiously carried out when programs are provided for and implemented ahead of time. Monitoring for leaks and contamination is discussed in PART III under "Site Monitoring."

MONITORING AND LEAK DETECTION PROGRAMS

Identifying a leak immediately after it begins is critical in limiting environmental impacts and resource degradation. The ability to detect a breach in the liner quickly is accomplished by incorporating a direct monitoring leak detection system into the design of the pad. Such a system will be located directly beneath the liner. When a leak is detected in the top liner, it is not always necessary to correct that problem when a second liner is containing the leakage. A second leak detection system should be placed below the second liner in order to provide warning in the event that this liner is also breached. If the second liner is breached, contamination of the ground will occur; however, knowing of the leak immediately will enable the determination of the amount of solution escaping and allow measures to be implemented to remedy the problem.

Monitoring programs that rely solely on ground-water monitoring wells, lysimeters, and/or monitoring surface waters are not adequate. A leak that is detected by a well indicates that the entire subsurface between the pad and the well has already been contaminated and substantial solution volume has been lost, while the location of the leak in the pad is still unknown. This type of monitoring is useful in tracking the extent, location, and speed of a contamination plume. Direct monitoring systems are necessary in a leaching operation to ensure expedient leak detection.

Monitoring and sampling of water should begin before implementing cyanide leaching to provide background or baseline water quality data. Surface water and ground water may already contain contaminants from natural or man-made sources. Monitoring water up-gradient of the leaching site during operations is important for this reason also. If contaminants are detected, it is important to know the source or sources. It is not necessary to establish numerous wells or sampling points around the project area. A few strategic points are adequate. If a leak is identified, it may then be appropriate to add additional monitoring sites to track the contamination. A proposed leaching operation cannot be approved without an adequate monitoring program.

ACCIDENT RESPONSE AND CONTINGENCY PLANS

An accident response and contingency plan prepared ahead of time identifying steps to be taken in the event of a spill or leak will provide a quicker, more efficient response, minimizing the environmental impact. Such plans will address spills occurring during the transport of chemicals across park lands (previously discussed under "Access"), spills occurring during the movement of chemicals from storage sites to the ponds, and leaks in liners and breaching of the pond. An emergency first aid/medical treatment plan or program should be prepared by the operator for personnel at the leaching operation.

These response plans detail measures the operator will take to contain, neutralize, and remove the chemical contamination. Contaminated soils should be removed and disposed of at the leaching site within the area that is protected by liners. Any other manner of disposal or disposal site will require that the contaminated soil be treated as hazardous wastes (see PART II, Resource Conservation and Recovery Act).

Dealing with leaks in liners is a more difficult situation. The remedial action taken depends on many factors, such as size of leak, remaining life of the operation, geology, hydrology, and the biological environment of the area. A small, slow leak at an operation with a long remaining life may require correction of the leak due to the volume of solution that would be lost if the operation were to continue. A large leak at an operation that is near completion or shut-down may not require mitigating actions, because the volume of solution that would be lost is small and not significant. These are just two examples, each representing one extreme. The number of examples or situations that could be presented are numerous and varied, depending on site-specific circumstances.

The specific remedial action taken to correct leaks in liners or breaching of ponds and correct the resulting problems will be dictated by circumstances that cannot be predicted. However, the operator should be able to identify steps that can be taken immediately to limit adverse impacts, allow time to formulate a more detailed plan, and identify general courses of action.

The operator should provide the National Park Service with an emergency first aid or medical treatment plan. This will allow park staff to be informed as to what actions personnel at the operation may take during an emergency situation. Prior knowledge can prevent inadvertent interference, facilitate speedy action, and enable park staff to assist the operator if the need arises during an emergency.

DECOMMISSIONING AND RECLAMATION PLAN

It is imperative that the necessary steps are taken to ensure that the area will be left in a state as near to natural conditions as possible and ensure the integrity of the environment during operation closure. Decommissioning and reclamation are discussed in PART III. Measures taken during decommissioning will depend on local conditions and various aspects of the individual operation. The options and discussion presented in PART III provide guidance in determining the extent of the procedures to be required of operators, and other documents provide detailed discussion and guidance on reclamation of mined lands.

Rinsing of the heap with fresh water or water containing neutralizing or oxidizing agents should always be required to flush contaminants from the heap or neutralize any residual cyanide within the heap. Once the heap has been flushed, it can be reclaimed following standard reclamation practices (such as recontouring, covering with topsoil or other medium suitable for revegetation, etc.).

The ponds will contain not only solution or contaminated water, but also contain solids that have settled out of solution during the leaching operation. There may also be various types of salts that have precipitated out of solution in the ponds. The solution may be discharged under conditions set forth in a discharge permit; however, the solid material will require other steps to prevent contamination of the environment. One measure that can be taken involves the excavation of the material and removal from the park. The operator would have to follow regulations for hazardous wastes and materials if this type of action is taken. This measure will generally not be feasible. A second measure that is much more feasible involves leaving the solid contaminants in the pond. The pond can be backfilled, followed by covering with a cap of impermeable material to prevent inflow of precipitation or additional water. The pond would effectively be sealed, preventing the release of contaminants into the environment. In this second measure, not all of the contaminated water would have to be discharged. Backfilling would have to be carefully performed to maintain liner integrity. Once the above procedures are completed, standard reclamation procedures can be accomplished.

POST-RECLAMATION MONITORING PLAN

Monitoring a site after operation closure and reclamation is a step that can be required of the operator, if it is determined that the need exists. The time frame for this monitoring should not be less than 5 years, during which the bond posted by the operator before implementing the plan must continue to be held by the National Park Service. The bond will ensure that the operator will take action to remedy any problem that may occur. If all sources of potential contamination are eliminated during decommissioning of the site, post-reclamation monitoring may not be necessary. This decision by NPS personnel will have to be based on site-specific conditions of the area and the operations, such as measures taken by the operator at the end of operations and the natural resources occurring in the area.

The monitoring plan should include

visual inspection of the earthwork (e.g., recontouring), visual inspection of revegetation, photographic documentation, and water sampling. Data must be recorded in a notebook. The frequency of inspections and sampling will depend on site-specific conditions. The operator must provide the National Park Service with a report and data from each site visit.

SUMMARY

The operator must strive to minimize environmental impacts during and after operations, with the complete elimination of any real and potential sources of environmental degradation. The National Park Service must ensure that the activities and procedures at the operation will help achieve this goal and that they are not in conflict with the plan of operations as it has been approved with stipulations. The following is a list of items that must be considered as stipulations for proposed cyanide leaching operations, if the operator has failed to identify or include them. It may be argued that the inclusion of such items is "overdesign" and, thus, not necessary. However, that can be argued about many safety precautions that are required by law, regulation, or statute. Overdesign can be justified or warranted for most sites within units of the National Park System when the potential adverse environmental impacts are considered. Although some of these items are not common to most cyanide leaching operations, they are technologically feasible. The following list does not identify reclamation practices that are considered "standard," such as recontouring, covering with topsoil and revegetation. As previously mentioned, other reports have been or are being prepared that discuss reclamation and some discussion is provided in PART III of this manual.

1) Double-liner systems should be used for pads, ponds, and ditches where cyanide solution is present and where the top liner is designed as the primary containment structure or system.

2) Double-liner systems for pads, ponds, and ditches must be constructed in a manner that effectively creates a single, inclusive doubled-lined area.

3) A single-liner system will be placed beneath processing plants and solution pipelines in a manner that will contain spills or leaks and allows the flow or migration of spilled or leaked solution onto the double-lined area.

4) Double leak detection systems should be installed where double liners are required - one under the secondary liner and one between the primary and secondary liners.

5) An emergency overflow pond should be constructed immediately below or down-gradient of solution ponds and should contain a single-liner system.

6) The storage volume of interconnected solution ponds should be equal to the operational solution volume plus the volume of solution to flush the heap and the intercepted runoff volume of a 100-year, 24-hour storm.

7) Diversion ditches and berms should be designed to handle the peak flow from a 100-year, 1-hour storm.

8) All chemicals must be stored within locked buildings or structures containing artificial floors, and the

storage site must be located within the flood control berms or ditches around the operation.

9) A 6-foot high chain-link fence should be constructed around the entire operation, including chemical storage areas, with gates that can and will be locked during periods of inoperation.

10) A watchman or security guard should be located on-site during periods when other employees are not present.

11) Warning signs must be posted at the entrance gate, on access roads, and along the security fence at 50-foot intervals, identifying the use of hazardous chemicals on-site.

12) An emergency response and contingency plan must be submitted for potential accidents, spills, or leaks that may occur during the transport of chemicals and during operations.

13) An emergency first aid or medical treatment plan should be submitted.

14) The operator must use triple-rinsing of all chemical containers and chemical-contaminated equipment, tools, and materials. The rinsing must be performed in an area that is double-lined and drains onto the heap pad and into the solution ponds.

15) The operator should take steps to neutralize cyanide solutions and cyanide-contaminated soils or other materials at the end of operations.

16) The operator will not dispose of or leave solution and contaminated soils or other materials in a manner that may allow the spreading or release of contaminants into the environment.

17) The operator will not release or discharge solution or contaminants unless authorized by the National Park Service and unless the operator has obtained the proper discharge permits.

18) Liners not required for the containment of solution or contaminated materials should be removed from the park if possible or punctured where exposed or not buried beneath the heap during decommissioning and closure.

The National Park Service

REGULATIONS PERTAINING

to

SODIUM CYANIDE

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The National Park Service

REGULATIONS PERTAINING TO SODIUM CYANIDE

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Regulations
Pertaining to Sodium Cyanide

Public Law 94-429
94th Congress, S. 2371
September 28, 1976

An Act

To provide for the regulation of mining activity within, and to repeal the application of mining laws to, areas of the National Park System, and for other purposes.

code of federal regulations

Parks, Forests, and Public Property

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PARTS 1 TO 199
Revised as of July 1, [illegible]

Department of the Interior
National Park Service

INTRODUCTION

PART II discusses the federal regulations governing the storage, handling, transportation, and disposal of hazardous waste and materials. This discussion, although directed towards sodium cyanide, can also be generally applied to all cyanide compounds listed by the Environmental Protection Agency (EPA) as hazardous waste and/or substances, and by the Department of Transportation as a hazardous material. The term hazardous waste means any solid waste, or combination thereof, which may cause or contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or pose a substantial present or potential hazard to human health or the environment when improperly managed. Hazardous material means a substance or material in a quantity or form which may pose an unreasonable risk to health and safety or property when transported in commerce. Any hazardous waste when transported would, therefore, also be a hazardous material.

There are five federal statutes of primary importance concerning the use of cyanide compounds. The Resource Conservation and Recovery Act addresses the storage, handling, transportation, and disposal of hazardous waste. The portion of the act dealing with cyanide is regulated by 40 CFR Part 260. The Clean Water Act designates hazardous substances and regulates the discharge of such substances into U.S. waters. Regulations for this act are found in Title 40 of the CFR. The Federal Mine Safety and Health Act, as regulated by Title 30, Subchapter N, establishes mandatory standards for the storage and handling of cyanide when used in mining operations. The Hazardous Materials Transportation Act regulates the transportation of hazardous materials in commerce. The regulations which prescribe the requirements for transportation are found in 49 CFR Subchapter C.

In addition to the above laws and regulations, the National Park Service controls the use of cyanide under the regulations of 36 CFR 9A where a plan of operations is required for mineral activity on a mining claim within any unit of the National Park System.

Under EPA regulations, states can qualify to regulate hazardous wastes and substances in lieu of federal enforcement. In using cyanide compounds, many states are just beginning to consider drafting regulations for its use. Generally, those states which have experience (e.g., California, Nevada) with the use of cyanide compounds are more concerned with cyanide containment rather than cyanide neutralization levels.

With the exception of the 9A regulations, all the regulatory requirements cited in this section must be complied with both inside and adjacent to NPS units.

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NPS LAWS AND REGULATIONS

The regulations at 36 CFR 9A control all activities in connection with mining claims (patented and unpatented) and mill sites within any unit of the National Park System. Operations consist of all functions, work, and activities in connection with mining on claims, including development and extraction; dumping of mine wastes and the stockpiling of ore; the processing of mineral commodities; and reclamation.

Cyanide leaching operations can be conducted within an NPS unit only under, and in accordance with, an NPS approved plan of operations. A plan of operations may not be approved if it allows for the use of federal land outside the claim boundary; if it provides for the diversion of water from a point outside the claim boundary; or, if access across any unit to claims that lie outside the unit unless such access is by foot, pack animal, or designated road. In Alaska, only temporary access may be granted across a park unit to nonfederal property owners such as claimants, for purposes of exploration or other temporary use of the claim. This access should not exceed more than one year. Thus, such temporary uses cannot include mining operations that are projected to require a longer period of time (e.g., cyanide leaching operation).

In the plan of operations the operator must submit information required by 36 CFR 9A. These information requirements include the following:

1) Names and addresses of the operators.

2) Map of the proposed area of operations, access routes, and surface facilities.

3) Estimated timetable for each phase of operations.

4) Nature and extent of the deposit.

5) Reclamation plan.

6) Evidence of compliance with any applicable federal, state, and local laws.

7) Discussion of the unit's planning documents.

8) Environmental report.

The environmental report must contain data that enables the NPS to effectively analyze the impacts of the proposed operations on the unit. This report must provide the NPS with a complete cultural and biological resource survey.

Reclamation requirements are also set forth in 36 CFR 9A. Reclamation must be performed simultaneously with operations where possible. In no case may reclamation be initiated any later than six months after completion of operations.

The Regional Director's approval of a proposed plan of operations is based on the examination and evaluation of the required environmental information, the operations which are proposed, and the reclamation plan; a determination of appropriate bonding level (equal to the estimated cost of reclamation); and the determination of impacts on unit resources from proposed operations and whether an environmental impact statement is necessary under NEPA.

Approval of the proposed plan of operations constitutes the permit for the conduct of operations and access. In Alaska, a separate access permit, issued pursuant to the regulations in 43 CFR 36.10 or 36.11 may be necessary. The plan of operations will be considered the written application for that access permit if an access permit is required in Alaska.

Before approving a proposed plan of operations for cyanide leaching on unpatented mining claims, the NPS must verify that the claimant has complied with all requirements pertaining to recordation, and the claim must undergo a validity examination. These requirements are as follows:

1) Claim must be recorded with the appropriate local/state office.

2) If the claim was located before October 22, 1976, claimant had until October 22, 1979, to file with the appropriate BLM office.

3) If the claim was located after October 22, 1976, the claimant must record the claim with the appropriate BLM office within 90 days of location.

4) For claims within the boundaries of any NPS unit the claimant must have recorded the claim with the Superintendent's office of the appropriate unit by September 29, 1977.

5) Claimant must file annually before December 31 an affidavit of assessment work or notice of intent to hold with the appropriate BLM office.

6) Claimant must file annual affidavit of assessment work with the appropriate state/local office as determined by state law.

Failure to meet any one of these requirements could be deemed to constitute an abandonment of the mining claim by the owner.

The NPS will not approve a proposed plan of operations that provides for the use of cyanide unless the operator has all necessary permits under the laws described in this chapter.

RESOURCE CONSERVATION AND RECOVERY ACT

The Resource Conservation and Recovery Act, (42 U.S.C. 6901 et seq.) as amended, referred to as RCRA, made provisions for the listing of hazardous wastes and the promulgation of regulations addressing the storage, handling, transportation, and disposal of such hazardous wastes. Minimum requirements were established whereby states can take over the responsibility for regulating the disposal of hazardous waste through the development of a solid waste management plan for their state. Each plan must be approved by EPA and must address methods for disposal of hazardous waste in lieu of the federal program. Approved state programs are subject to revision and can be revoked for noncompliance, showing of inadequacy, or other necessary revision.

LISTING AS A WASTE

Sodium cyanide is listed as an acute hazardous waste* under 40 CFR 261.33(e) and is subject to the regulations found under Part 261 of Title 40.

Sodium cyanide as a waste associated with the "extraction, beneficiation and processing of ores and minerals" is excluded from being regulated as a hazardous waste. However, sodium cyanide, is subject to regulation as a hazardous waste if and when:

1) It is discarded or intended to be discarded.

2) It is discarded or intended to be discarded within any container or inner liner removed from a container used to hold sodium cyanide.

3) There is any residue or contaminated soil, water, or other debris resulting from a clean-up of a spill of sodium cyanide into or on any land or water.

The Hazardous and Solid Waste Amendments of 1984 prohibit the land disposal of liquid hazardous wastes, including free liquids associated with any solid or sludge containing free cyanide at concentrations equal to or greater than 1,000 milligrams (mg) per liter.

Sodium cyanide residues in a container or an inner liner removed from a container are hazardous wastes if: 1) the container or inner liner has not been triple rinsed using a solvent capable of removing the residue; 2) the container or inner liner has not been cleaned by another acceptable scientific method; or 3) in the case of a container, the inner liner that prevented contact of the sodium cyanide with the container has not been removed.

Sodium cyanide when mixed with a solid waste is not a hazardous waste if the generator can show that the mixture consists of wastewater when the discharge is subject to regulation under Section 402 or Section 307(b) of the Clean Water Act and the cyanide is discarded as a result of de minimis losses from operations in which the cyanide is used as a raw material or when it is produced in a manufacturing process. De minimis losses as related to cyanide would include those from the handling of the substance (e.g., spills or leaks from the unloading or transfer of cyanide from containers, pipes, valves, or other means); minor leaks of process equipment and storage containers; minor leaks from well-maintained pump packing and seals; sample removal; relief device discharges; discharges from safety showers; and, rinsate from empty containers or from containers that are rendered empty by rinsing.

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* Waste designated as being an acute hazardous waste has been found to be fatal to humans in low doses or is otherwise capable of causing or significantly contributing to an increase in serious irreversible, or incapacitating reversible, illness.

Sodium cyanide is subject to the small quantity exclusion as defined in 261.5(e). A small quantity generator is not subject to regulation unless more than 1 kilogram of sodium cyanide is generated in a calendar month; or a total of 100 kilograms of any residue or contaminated soil, water, or other debris resulting from the clean-up of a spill, into or on any land or water. If these limits are exceeded, the generator is subject to regulation under Parts 262 through 265 and Parts 270 and 124 of Title 40 and the notification requirements of Section 3010 of RCRA. Section 261.5(f) allows a small quantity generator to accumulate sodium cyanide on-site. If the accumulated hazardous waste is in amounts greater than those set forth above, all of those accumulated wastes for which the limit was exceeded are subject to regulation under Parts 262 through 265 and Parts 270 and 124 of Title 40, and the EPA Administrator or the state with an authorized program must be notified pursuant to the requirements of Section 3010 of RCRA.

Cyanide as a hazardous waste that is being beneficially used (i.e., a use that is advantageous or useful to the operation), reused, legitimately recycled, or reclaimed is not subject to regulation. In addition, it can be accumulated, stored, or treated chemically or biologically before such beneficial use, etc., and not be subject to regulation.

GENERATORS OF HAZARDOUS WASTE

Part 262 sets forth the standards that are applicable to generators of hazardous wastes. A generator who treats, stores, or disposes of hazardous wastes on-site must first determine if the waste is hazardous as defined for sodium cyanide above. If the waste is hazardous, an EPA identification number must be obtained before any treatment, storage, disposal, or transportation. The generator must comply with the accumulation requirements. Records of test results, waste analysis, or other determinations made in determining if the waste is hazardous must be kept for at least three years; additional reports may be required concerning the quantities and disposition of such waste.

STORAGE OF HAZARDOUS WASTE

Accumulating hazardous waste on-site falls within two categories. If the waste is accumulated for 90 days or less, no permit is required if the following conditions are met:

1) It must be put in containers or tanks, and requirements covering their use must be complied with.

2) A preparedness and prevention plan, and a contingency plan for the protection of the facility must be completed.

3) Personnel must be trained to implement the plans.

If the generator accumulates waste for more than 90 days, then the facility is subject to permitting requirements and the requirements governing storage facilities. The time period for accumulation of wastes on-site begins when the accumulated wastes exceed a total of 1000 kilograms.

When a generator accumulates hazardous waste for more than 90 days, that generator becomes an operator of a storage facility and is subject to the requirements of Parts 264 and 265 and the permitting requirements of Part 270. Parts 264 and 265 establish minimum national standards which define the acceptable management of hazardous waste. These standards apply to, among others, ground-water protection, use and management of containers and tanks, surface impoundments, waste piles, land treatment, landfills, and incinerators.

If the generator transports or offers for transportation off-site hazardous waste for treatment, storage, or disposal, the generator must also comply with the manifest system, the pre-transport requirements, and the record keeping and reporting requirements.

TRANSPORT OF HAZARDOUS WASTE

Part 263 establishes standards if the transportation of hazardous waste requires a manifest under Part 262. These regulations do not apply to on-site transportation of such wastes. The EPA has adopted certain Department of Transportation (DOT) regulations governing the transportation of hazardous materials. These regulations require, among other things, labeling, marking, placarding, using proper containers, and reporting discharges. These EPA regulations apply to both interstate and intrastate transportation of hazardous waste and are enforceable by EPA. DOT revised its hazardous materials transportation regulations to encompass the transportation of hazardous waste as well. These regulations apply to intrastate and interstate transportation. DOT regulations are also fully applicable to transporters of hazardous waste and are enforceable by DOT. Regardless of actions taken by DOT, EPA retains its authority to enforce EPA regulations. A transporter of hazardous waste who meets the requirements of DOT regulations (49 CFR Parts 171 through 179) and who has received an EPA identification number and cleans up any hazardous waste discharge occurring during transportation or has taken any other required action to clean up a discharge of waste has complied with this part. If a discharge occurs during the transport of cyanide off-site, the transporter must take immediate action to protect human health and the environment. The transporter is also responsible for the clean-up of any hazardous waste discharge during transportation. The spill residues are considered to be hazardous waste and subsequent treatment, storage, and disposal of such is subject to regulation.

PERMITTING REQUIREMENTS

Part 270 covers basic permitting requirements. RCRA requires a permit for the storage of a hazardous waste. Storage means the holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed or stored elsewhere. Generators who qualify as a storage facility must have permits during the active life of the facility, including the closure period. EPA is the permitting authority unless a state has an EPA approved state program.

SUMMARY

To summarize, sodium cyanide in association with leaching operations constitutes a hazardous waste as follows:

1) When it is discarded.

2) When a container or an inner liner removed from a container holds residues, and any spill residues thereof.

3) Any solid waste generated from the treatment, storage, or disposal of sodium cyanide is a hazardous waste unless it does not exhibit any of the characteristics of hazardous waste as defined in 40 CFR Subpart C.

Several provisions promulgated under RCRA govern cyanide. To determine which provisions apply, a series of questions have been developed.

1) Is cyanide a hazardous waste as defined in 262.3? If yes, then

2) Is it generated by a small quantity generator? If yes, then it is subject to the small quantity requirements of 261.5.

3) If no, then is the cyanide being used or intended to be legitimately and beneficially used, reused, recycled, or reclaimed? If no, then it is subject to regulation under 262, 263, 264, 265, and 270 and 124, and the notification requirements of Section 3010 of RCRA.

4) If the cyanide is intended to be legitimately and beneficially used, reused, recycled, or reclaimed, then it is subject to requirements with respect to its storage and transportation at 262, 263, applicable provisions of 264 and 265, and 270 and 124 with respect to storage facilities.

The regulations found in the above mentioned Parts are very detailed and complex. If a generator of hazardous waste is subject to the requirements of these regulations, it is best for the generator to contact the EPA directly for advice as to how the regulations apply to a particular operation and/or facility.

3

CLEAN WATER ACT

The regulations found in 40 CFR 122 contain provisions for the National Pollutant Discharge Elimination System (NPDES) program which requires a permit for the discharge of pollutants from any point source into the waters of the U.S. A cyanide leaching operation may meet the criteria for a point source as defined in the regulations. Cyanide compounds do constitute a pollutant under the Clean Water Act (33 USC 1251 et seq.).

Section 311(b)(2)(A) (33 USC 1321) designates hazardous substances, elements, and compounds which, when discharged in any quantity into or upon the navigable waters* of the U.S. or beyond the contiguous zone, or which may affect natural resources, present an imminent and substantial danger to the public health or welfare, including, but not limited to fish, shellfish, wildlife, shorelines, and beaches. Part 116 of Title 40 of the Code of Federal Regulations designates several cyanides as hazardous substances and regulates their discharge.

Generally, the discharge of cyanide is not allowed; however, the discharge limitation is determined on a case-by-case basis. Discharge limitations are determined by one of two ways. If the limitation is based on water quality standards, the discharge cannot generally exceed .005 mg of free cyanide. If the limitation is based on technology, discharge is determined by management practices to control or abate the discharge. Discharge of cyanide from nonpoint sources (e.g., due to run-off) would be controlled by best management practices (BMPs).

Sections 301, 304(b) and (c), 306, and 501 of the Clean Water Act, as amended, authorized the limitation of effluents for categories and classes of point source polluters. 40 CFR 440, Subpart J, established effluent limitations for mills that use the cyanidation process to extract gold or silver. Section 440.102(d) requires that there will be no discharge of process wastewater to navigable waters from existing or new source mills which extract gold or silver by use of the cyanidation process. The discharge limitations can be exceeded in the event that the annual precipitation falling on the area and the drainage area contributing surface runoff exceed the annual evaporation. A volume of water equivalent to the difference between the combined precipitation and drainage area surface run-off and the annual evaporation may be discharged subject to the limitations set for mineral bearing ores. Other provisions apply for combined waste streams, storm exemptions, pH adjustment, and groundwater infiltration.

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* Navigable waters are defined as the waters of the U.S., including the territorial seas, and includes, but is not limited to 1) waters used (in the past, the present, or in the future) for commerce, including waters subject to the ebb and flow of the tide and including adjacent wetlands; wetlands are areas inundated or saturated by surface or ground water at a frequency or duration to support vegetation adapted for life in saturated soils; 2) tributaries of navigable waters, including adjacent wetlands; 3) interstate waters, including adjacent wetlands; and, 4) all other waters such as intrastate lakes, rivers, streams, mudflats, sandflats and wetlands), adjoining shorelines, into or upon the contiguous zone (the contiguous zone is that area extending not more than 12 miles from the baseline of the territorial seas).

40 CFR Part 117 sets forth the reportable quantity for each substance designated as a hazardous substance. For the cyanides this reportable quantity is equal to or greater than 10 pounds (4.54 kilograms) when discharged into or upon the navigable waters, except to the extent that the owner or operator can show that discharges are made in compliance with 40 CFR 264 and 265 and the permitting requirements (e.g., application requirements, standard permit conditions, and monitoring and reporting requirements) of 40 CFR 270. Failure to notify the appropriate agency of a discharge in quantities equal to or exceeding those determined for the cyanide compounds within 24 hours is subject to penalties and is liable for removal of such substance.

FEDERAL MINE SAFETY AND HEALTH ACT

The Mine Safety and Health Administration should be consulted for the proper standards regarding the storage and handling of sodium cyanide use in the cyanidation process. Mandatory standards for the storage and handling of materials used in mining operations have been established, and violations of these obligatory standards are subject to penalties. The regulations which pertain to storage and handling are found in Title 30, Subchapter N as authorized by the Federal Mine Safety and Health Act of 1977 (30 USC 957 et seq.), as amended.

5

HAZARDOUS MATERIALS TRANSPORTATION ACT

The Hazardous Materials Transportation Act (49 USC 1801 et seq.) authorizes the Department of Transportation to regulate the transportation of hazardous materials in commerce to protect against the risks to life and property. Sodium cyanide cannot be offered or accepted for transportation in commerce unless it is properly classed, described, packaged, marked, labeled, and in acceptable condition for shipment. 49 CFR, Subchapter C, prescribes the requirements for the transportation of hazardous materials, hazardous wastes, and hazardous substances and their transport on carriers by rail car, aircraft, vessel, and by public highway; and, interstate and intrastate transportation.

Sodium cyanide is subject to the requirements of Subchapter C regardless of mode of transportation or hazard class. Sodium cyanide is also considered to be a Class B poison and as such certain requirements and exceptions apply to how it is packaged for transportation depending on whether the cyanide being transported is a solid or a solution.

Briefly, the substantive parts of 49 CFR, Subchapter C, that apply to the transportation of sodium cyanide are as follows:

Part 171 contains elements of common interest and definitions.

Part 172 lists and classifies those materials also designated as hazardous for purposes of transportation and sets forth the requirements of shipping papers, package marking, labeling, and transport vehicle placarding.

Part 173 includes definitions of hazardous materials for transport purposes and contains shipper requirements from the general requirements applicable to all shippers to the more detailed requirements pertaining to specific materials.

Part 174 applies to shipments by rail.

Part 175 applies to carriage by air and unique aspects of air transportation.

Part 176 addresses carriage by vessel and the requirements for stowage and handling of hazardous materials unique to water transportation.

Part 177 applies to transportation of hazardous materials across public highways.

Part 178 describes in detail the specifications for the packaging to be used in transporting hazardous material.

Part 179 establishes the specifications for the use of tank cars as containers for rail transport.

If a discharge occurs during the transport of cyanide off-site, the transporter must take immediate action to protect human health and the environment. The transporter is also responsible for the clean-up of any hazardous waste discharge during transportation. The residues from a spill are considered to be hazardous waste. Subsequent treatment, storage, and disposal of such residues are subject to the regulations governing hazardous waste.

Environmental Handbook
for
Cyanide Leaching Projects

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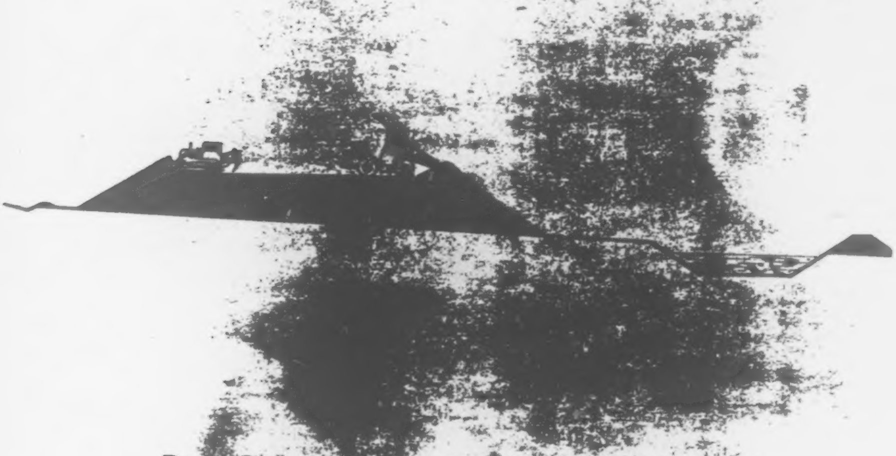

Department of the Interior
National Park Service
Energy, Mining & [illegible] Division

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The National Park Service

Environmental Handbook for Cyanide Leaching Projects

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The National Park Service

Environmental Handbook for Cyanide Leaching Projects

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Preface

This handbook has been written for the National Park Service to provide information about the environmental effects of cyanide leaching operations. Cyanide leaching is a method of minerals processing used primarily for the extraction of gold and silver. Most cyanide leaching operations in the United States occur in the western states.

The intended audience for this handbook are National Park Service rangers and technical staff who may not have a great deal of knowledge of mining and ore processing, but who may be dealing with cyanide leaching operations within or near the boundaries of Park Service lands. The handbook assumes some knowledge of natural sciences, and although it presents information in some technical detail, it is hoped it will be readily understandable to readers who may not have strong technical backgrounds.

The handbook is divided into four chapters. Chapter One, Fundamentals of Cyanide Leaching, is an overview of cyanide chemistry and how leaching systems work. In Chapter Two, Environmental Resources, the assessment of potential environmental effects due to cyanide leaching operations is discussed both in a regulatory context and in the context of various natural resources. Chapter Three, Environmental Safety and Control, discusses operational aspects of cyanide leaching projects with particular regard to how those aspects may affect environmental resources. The last chapter, Decommissioning and Reclamation, provides discussion on the restoration of project sites to beneficial use.

The assistance of a number of outside reviewers of this handbook is gratefully acknowledged. Thoughtful reviews by Homestake Mining Company, the Colorado Division of Mined Land Reclamation and the Environmental Protection Agency are much appreciated. The cooperation and guidance provided by the E.I. du Pont de Nemours & Co. (Inc.), and in particular by Fred DeVries of Du Pont, must be mentioned. In addition, Du Pont has made available two very informative brochures about cyanide which can be found at the back this handbook.

1

Fundamentals of Cyanide Leaching

Cyanide is a simple chemical compound and a fundamental building block of many organic compounds. Its occurrence in nature is widespread. Cyanide is synthesized by many types of living organisms including bacteria, fungi, higher plants, and insects. Many species of higher plants can produce concentrations of cyanide high enough to be acutely toxic to livestock or humans. Many industrial uses for cyanide have been discovered, principally in the chemical, metal, and mining industries. It is an important ingredient in processes for electroplating, case hardening of steel, metal cleaning, metals leaching, and ore flotation. A host of products ranging from pesticides and fertilizers to drugs and plastics require cyanide in their manufacture.

Hydrocyanic acid (HCN), also called hydrogen cyanide or prussic acid, is believed to have been first synthesized by the Swedish chemist Karl Scheele in 1782. The use of cyanide solutions in the leaching of precious metals from gold- and silver-bearing ores has been an important process since the late 1800's, when relatively strong leaching solutions were used in vat-type processes. It was also discovered that cyanide had an affinity for forming compounds with certain other metals, the so-called cyanicides or "cyanide-consuming metals," and processes involving cyanide for the milling of specific base metals were later developed. Cyanide leaching is also useful as an ancillary process to other more traditional milling techniques (e.g., flotation), to improve metal recovery from the slime fractions of discarded tailing.

Research by the U.S. Bureau of Mines in the late 1960's and early 1970's suggested that open heap leaching techniques could be an economical method for extracting precious metals from certain low grade ores, including many waste rock dumps from old mines. Subsequently, a number of publications describing such techniques and the results of field trials indicated the viability of heap leaching methods for some ore bodies (Heinen and Porter 1969; Merwin et al. 1969; Pizzaro et al. 1974; and Chisholm 1975). Free market pricing and a sharp increase in the price of gold spurred wide interest in this technology in the late 1970's. In addition, capital costs for construction of open heaps are generally lower than for traditional milling facilities. For reasons of the occurrence and types of ores amenable to cyanide leaching, most ore leaching in the United States is conducted in the western states.

Current government regulation of mining and milling operations using cyanide varies considerably from state to state and responsibility for enforcement of environmental regulations can be divided between state and local authorities, depending on such circumstances as land ownership and local or state environmental legislation. The lack of regulatory consistency between states is largely attributable to an exemption (currently under review) of mining operations and their related waste products under the Resource Conservation and Recovery Act of 1976 (RCRA), under which the disposal of solid and hazardous wastes are regulated by the Environmental Protection Agency (EPA). It is not certain how long the current status will continue. Under the Chaffee-Florio reauthorization of 1984, all wastes, whether mining-related or not, containing ≥1000 ppm free cyanide are defined as hazardous, and subject to regulation under RCRA. Some federal regulatory control with respect to most cyanide leaching projects may be exerted under the requirements of the Clean Air Act and the EPA's National Pollution Discharge Elimination System (NPDES). Finally, on-site storage and handling of cyanide reagent at mining operations is regulated by Mine Safety and Health Administration (MSHA).

The National Park Service (NPS) is concerned that if inadequate environmental safety measures at mining operations using cyanide are allowed to exist, both within and adjacent to park lands, valuable park resources may be affected. This handbook provides information by which the NPS may evaluate environmental issues related to cyanide leaching operations. It is not intended to be a model on how each and every cyanide leaching operation should be constructed or regulated. There are many factors which must be considered in determining whether a threat to resources due to cyanide leaching operations is likely to exist.

Basic Cyanide Chemistry

Cyanide is composed of a single atom each of carbon and nitrogen bonded to form the radical ion CN^-. This ion reacts readily with both organic and inorganic cations to form stable ionic complexes.

Cyanide compounds of sodium and potassium (and others) have been used extensively for leaching of precious metals from ores. Because of the commercial availability of low cost sodium cyanide (NaCN), its use in precious metals leaching processes in the United States has become prevalent. Sodium cyanide is a white, crystalline, water soluble compound. Physical properties of NaCN alone with other technical information are given in *Sodium Cyanide: Properties, Uses, Storage and Handling*, a Du Pont brochure included at the end of this handbook. At present, the only commercial manufacturer of dry NaCN in the United States is the Du Pont Company. Sodium cyanide is also imported to the United States by manufacturers in Taiwan, Japan, and Europe. The worldwide production of NaCN is about one-half billion pounds per year. Approximately one half of domestic NaCN production is used in minerals processing.

In an aqueous solution, sodium cyanide dissociates to form sodium ions (Na^+) and cyanide ions (CN^-). Cyanide ions readily hydrolyze (with hydrogen ions [H^+] in water) to form hydrocyanic acid (HCN). The reactions equilibrate (in a high pH environment) as follows:

$$Na^+ + CN^- + H_2O \longleftrightarrow HCN + Na^+ + OH^-$$

To remain stable, a solution of NaCN is dependent on an elevated pH.

Hydrocyanic acid is a colorless liquid with a boiling point of about room temperature (25.5°C). It has an odor similar to that of almond oil. Hydrocyanic acid vapor (HCN gas) is less dense than air, flammable and toxic. Hydrocyanic acid has a high vapor pressure and thus readily evaporates. The amount and rate of HCN gas formation from solution varies with solution concentration, temperature, and pH. In general, higher temperatures and solution concentrations and lower pHs will promote the generation of HCN gas.

HCN- gas is readily formed when sodium cyanide and solutions of sodium cyanide are subjected to acidic environments, even by very weak acids. The reaction between NaCN and strong acid, such as sulfuric acid is:

$$2NaCN + H_2SO_4 \longrightarrow Na_2SO_4 + 2HCN\uparrow$$

Sodium cyanide solutions in the presence of oxygen have the ability to solubilize free gold and silver (and other metals) in complexed metallo-cyanide forms in a process known as cyanidation. It is now generally recognized that the gold and silver dissolution reactions which occur in the leaching process are bimodal in nature, with most of the precious metals dissolved according to the following equation given by Heinen et al. (1978) for the dissolution of gold:

$$2Au + 4CN^- + O_2 + 2H_2O \longrightarrow 2Au(CN)_2^- + H_2O_2 + 2OH^-$$

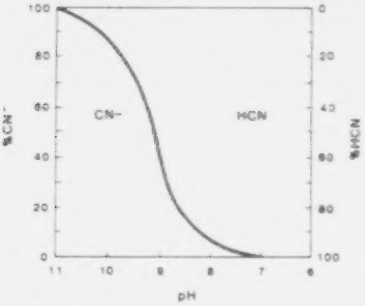
A lesser amount of the metal is solubilized according to Elsner's equation, originally accepted as the action by which virtually all of the metal was dissolved, shown below:

$$4Au + 8CN^- + O_2 + 2H_2O \longrightarrow 4Au(CN)_2^- + 4OH^-$$

The reactions for the cyanidation of silver are analogous.

In make-up solutions for process waters, solution pH must be maintained high enough to prevent generation of harmful concentrations of HCN gas. Figure 1 is a graph of the relationship between solution pH and the ratio of HCN to CN in a weak cyanide solution. As indicated by the graph, virtually all of the cyanide is converted to HCN gas at pH 7 or less. From both a safety and reagent consumption perspective, it is important to maintain an elevated solution pH throughout processing operations.

Figure 1. Relationship of solution pH and the relative concentrations of CN⁻ and HCN.



Source: Huiatt et al. 1983

Solution pH may be controlled by the addition of lime (CaO) or caustic soda (NaOH). Caustic soda is generally more costly than lime. Du Pont recommends that a 0.5 percent (50 lbs. caustic/ton water) sodium hydroxide solution be prepared prior to the addition of cyanide, and that a pH of 12 be maintained for make-up solutions at ambient temperature. The Arizona Division of Mines similarly recommends a pH of 12 for make-up (mixing) solutions and a pH of 10.5 for the working solution. Barsky et al. (1962) suggest that the optimum process solution pH for leaching purposes is 10.3. The control of pH is particularly important in solutions of relatively high cyanide concentrations to maintain stability of the solution. In general, it is advisable to increase solution pH as the cyanide concentration increases.

After gold and silver have been leached, the metals must be recovered from solution. The most common methods employed are carbon adsorption and zinc precipitation. Carbonaceous materials have the ability to adsorb gold and silver from cyanide solutions and are so effective that the presence of organic matter in some sedimentary rocks and soils may significantly hinder recovery. In a recovery circuit, tanks containing activated, granulated charcoal (commonly produced from coconut shells) are percolated through with pregnant (gold and silver-bearing) solution. The metals are adsorbed onto the carbon. It is not completely understood as to how the process actually works. One popular theory suggests that adsorption takes place by ion exchange (Heinen et al. 1978).

The zinc precipitation method uses finely ground zinc to induce precipitation of the precious metals from solution. The process works by displacing the metal-cyanide complex by the addition of zinc, which is higher in the chemical displacement series (Siecrist and Powers 1966). The process solution is usually filtered prior to implementing precipitation.

Additional steps are necessary to desorb gold and silver from carbon or to separate it from zinc. These techniques will be discussed in a later section.

Ores Amenable to Cyanide Leaching

Based on the chemistry discussed above, it would appear that cyanidation would be the preferred method for milling of gold and silver ores. But some base metals and other complexes have a high affinity for cyanide and may grossly reduce the efficiency of the process. These are the cyanicides and include iron, copper, zinc and antimony sulfide minerals, and some arsenic minerals (Heinen et al. 1978). These minerals either act to interfere with the dissolution reactions, have a greater complexing potential, or cause rapid consumption of cyanide solution. The last is due to acidic conditions produced in the ore as a result of the oxidation of metal sulfides shown in the following relationship:

$$\begin{array}{l}\text{metal sulfides}\\ +\ \text{oxygen}\\ +\ \text{water}\end{array} \xrightarrow[\text{bacteria}]{\text{hydrolysis}} \begin{array}{l}\text{metal sulfates}\\ +\ \text{sulfuric acid}\end{array}$$

There are often other limiting factors. Heinen et al. (1978) list the following characteristics that an ore must possess if it is to be amenable to the heap leaching process:

1) The gold and silver contained in the rock are leachable by cyanide;
2) The size of the gold and silver is microscopic in size;
3) The host rock is permeable to solutions;
4) If the host rock is of low permeability, the gold and silver can be suitably exposed during crushing to a finer mesh;
5) The host rock is free of carbonaceous material which will cause readsorption or premature precipitation of the metals;
6) The ore is relatively free of cyanicides and acid-forming constituents which would cause a high rate of reagent consumption;
7) The ore does not contain an excessive quantity of clays or other fines which would impede the percolation of solution.

Definitions of Cyanide Forms

Cyanide can occur in different forms in solution and be analyzed by different techniques. Cyanide may occur in the form of HCN, in its ionic form, CN^-, and in complexes with metals and organic compounds (the nitriles). The actual composition of a solution may only be assessed accurately if it is known what form of cyanide is being analyzed and reported. Many older data appearing in the literature do not adequately distinguish between the type of cyanide reported and the problem persists today with a few analytical labs. This may stem, in part, from some operators who merely request an analysis for cyanide without specifying which form, and the failure of some labs to report data respective to form.

It is now accepted practice to make reference to cyanide as either "free" or "complexed", and some regulatory programs may also require a determination of "weak acid-dissociable" cyanides. Definitions of the different forms are as follows:

Free Cyanide: Free cyanide is defined as the sum of cyanide present as HCN and CN^-.

Total Cyanide: Sum of both free and complexed cyanides; includes all metallo-cyanides and organic compounds (nitriles).

Weak Acid-dissociable Cyanide: Those cyanides, both free and those metallo-cyanide complexes, capable of converting to HCN gas in a slightly acidified medium. Metal complexes particularly amenable to weak acid dissociation include zinc and cadmium complexes. Silver, copper, and nickel-cyanide complexes have varying degrees of stability. Iron-cyanides are not amenable to weak acid dissociation.

Huiatt et al. (1983) give the relative stabilities of some of the cyanide complexes present in many gold process solutions as shown in Table 1.

Table 1. Relative stability of some cyanide complexes.

Complex	Stability
$Zn(CN)_4^{2-}$	least stable
$Cd(CN)_3^-$	↓
$Cd(CN)_4^{2-}$	↓
$Cu(CN)_2^-$	↓
$Cu(CN)_3^{2-}$	↓
$Ni(CN)_4^{2-}$	↓
$Ag(CN)_2^-$	↓
$Fe(CN)_6^{4-}$	↓
$Co(CN)_6^{4-}$	↓
$Au(CN)_2^-$	most stable

Mobilization of Cyanide

The mobility of various forms of cyanide through the soil to surface or ground waters has received relatively little research. Very little is known about the migration of low concentrations of free and complexed cyanides through the soil or the movement of cyanides in spent ore piles following cyanidation.

Sodium cyanide, if introduced to dry, alkaline soils, may remain stable for long periods of time. In the presence of water, sodium cyanide may be readily solubilized. In moist environments with generally more acidic soils, cyanide may be readily solubilized and complexed with available cations or degraded by biological processes.

Work conducted by Alesii and Fuller (1976) to determine the mobility of potassium cyanide in various soils concluded that low pH, presence of manganese and iron oxides, kaolin, and clays with high positive charges tend to limit the mobility of cyanide (measured in the experiments as KCN and a ferricyanide complex). It was also shown that soils with high pH, free calcium carbonate ($CaCO_3$), low clay content, and clays with high cation exchange capacities tend to increase the mobility of the cyanides evaluated. The cyanide complexes of most cations are soluble to one extent or another but may migrate only a relatively short distance through the soil before being converted to nitrates under aerobic biological conditions. In an anaerobic environment, researchers have shown that cyanides denitrify to form gaseous nitrogen compounds which are liberated to the atmosphere (Towill et al. 1978). They conclude that the movement of cyanide in soil is generally quite limited due to complexing with trace metals and biological metabolism. But Murrmann and Koutz (1972) reported that cyanide ions are not strongly adsorbed or retained by soils.

A study by the Bureau of Mines (EPA 1976) evaluating the water quality around inactive mines reported no success in finding any mobile forms of cyanide in analyzed tailing samples. The report indicates that the cyanides were combined with organic matter and therefore rendered non-toxic.

Cyanide Reactions and Natural Transformations

Unlike many pollutants which may accumulate in the environment, cyanide is a very reactive and relatively short-lived contaminant. As such, cyanide is considered to be a transient pollutant. Historically, the role and significance of natural processes in the degradation of cyanides has not been well understood. Work conducted by the Wastewater Technology Center of Environment Canada, and others has provided information on the natural destructive mechanisms and longevity of cyanides in process solutions (Schmidt et al. 1981). A number of processes have been identified as potentially significant in the natural degradation or depletion of cyanide in effluents from many gold processing operations. These processes are volatilization, oxidation, biodegradation, photodecomposition, and cyanide-thiocyanate reactions. For solutions of high concentration, polymerization and hydrolysis may also be important.

Volatilization

Volatilization is probably the most important mechanism in reducing cyanide concentrations at ore processing operations because of the acidic character of many ores and the ease by which volatilization may occur under such conditions.

Free cyanide, as earlier defined, exists in solution as an equilibrium between the free radical cyanide and hydrocyanic acid:

$$HCN \longleftrightarrow H^{+} + CN^{-}$$

This equilibrium is pH dependent and shifts to the left with increasing acidity so that the ratio of $[CN^{-}]$ increases as the pH is reduced (Figure 1). Hydrogen cyanide has a sufficiently high vapor pressure such that the liberation of HCN gas may readily occur under normal atmospheric pressures. The volatilization potential of HCN is promoted by a number of factors given by Dodge and Zabban (1952) including reduced liquid depth to surface area ratio, decreased pH, increased temperature, and increased solution turbulence.

Weakly complexed metal cyanides can dissociate under slightly acidic conditions to produce additional free cyanide and metal ions. The free cyanide rapidly hydrolyzes to assume the molecular HCN form which may then be liberated from solution.

Oxidation

Chemical oxidation of cyanides has long been used to detoxify cyanide solutions. One such method has been to use chlorine in the treatment of effluent waters. The role of natural oxidation processes, however, are little understood and it is uncertain whether the reactions may be significant without biochemical conversion. Owerbach (1978) and others have suggested that a certain amount of free cyanide is converted to cyanate under aerobic conditions. At a solution pH of about 8 to 9, cyanate formed by the oxidation of cyanide salts hydrolyzed in water to form ammonia and carbon dioxide. If natural oxidation is occurring in process solutions, the following chemical sequence is most likely:

$$HCN + 1/2\ O_2 \longrightarrow HCNO$$
$$HCNO + H_2O \longrightarrow NH_3 + CO_2$$

In evaluating the formation of cyanate over time in a relatively shallow holding pond designed for discharged mill process solutions, Schmidt et al. (1981) concluded that oxidation processes within the pond may have accounted for about 11 percent of the decrease in cyanide observed over a six month period during the warm season.

Biodegradation

Towill et al. (1978) noted a wide number of bacterial species capable of degrading cyanide. Both bacteria and protozoa act to degrade cyanide to rather innocuous chemical products. Biochemical degradation of cyanide may occur under both aerobic and anaerobic conditions over a wide pH range. Under aerobic conditions, cyanide decomposition will yield cyanate which can be further hydrolyzed to ammonia and carbon dioxide:

$$HCN + 1/2\ O_2 \longrightarrow HCN$$
$$HCNO + H_2O \longrightarrow CO_2 + NH_3$$

Anaerobic decomposition of cyanide promotes thiocyanate as a first end product. Thiocyanate is quite biodegradable and is known to be generally more stable than cyanate. The thiocyanates may then hydrolyze to produce hydrogen sulfide, carbon dioxide and ammonia. The general pathways for anaerobic decomposition have been suggested by Schmidt et al. (1981) to be:

$$HCN + S \longrightarrow HCNS$$
$$HCNS + 2H_2O \longrightarrow H_2S\uparrow + CO_2 + NH_3\uparrow$$

Data regarding the effectiveness of biodegradation are lacking, and the effectiveness of this mechanism in process waters warrants further investigation. At least one mining company, Homestake Mining Company, located near Lead, South Dakota, has in operation a full-scale commercial biodegradation process to lower cyanide and metals concentrations in barren process solutions, and is the key treatment system in maintaining the quality of a point source discharge.

Photodecomposition

Table 1 lists some of the metallo-cyanide complexes and relative bonding strengths of complexes produced in many ore processing effluents. Some of these complexes, such as the zinc, copper, silver, and cadmium-cyanide complexes are dissociable to free cyanide under weak acid conditions. Others, such as the iron-cyanide complexes (ferro- and ferricyanide), are strongly resistant to the influences of pH and chemical destruction. However, bonds between the ferro- and ferri-cyanide complexes are known to be readily susceptible to ultraviolet light. Broderius (1978, cited in Schmidt et al. 1981) reported that ultraviolet light from the mid-day sun on a Minnesota lake accelerated the decomposition of ferricyanide present in the water near the lake's surface. The decomposition rate (eg. half-lives for the iron-cyanide complexes) were observed to be 20 minutes for exposures at mid-day during the summer, and 50 minutes for mid-day exposures during the fall. Obviously, the ability and intensity of ultraviolet light reaching the molecules in solution will affect the destruction potential of the iron-cyanide complexes.

Cyanide-Thiocyanate Reactions

Thiocyanate (CNS^-) is a reaction product between cyanide and sulfur. Thiocyanate is considerably less toxic than cyanide. Thiocyanate is readily formed in the presence of ores containing sulfur compounds. Thiocyanate will also complex with metals in solution to form metal-thiocyanate complexes.

Many of the metal-thiocyanate complexes are insoluble and may precipitate from solution. This mechanism may play a role in the partial removal of some metals from effluent waters (Schmidt et al. 1981). However, the formation potential for metal-thiocyanate complexes tends to be much lower than the corresponding metal-cyanide complexes. Therefore, if both cyanide and thiocyanate exist in solution, the metal-cyanide complexes should form in preference to the metal-thiocyanate complexes. And in the relative absence of cyanide, the metal-thiocyanate complexes will be present (Schmidt et al. 1981).

Polymerization

Hydrogen cyanide in solution, particularly at high concentrations at neutral pH, react to form inert polymers. The loss of cyanide in solution by this mechanism may be pronounced. At lower concentrations a change in solution color to pale yellow or dark reddish brown may indicate that polymerization has occurred (although such a color in ore processing solutions may have a host of other causes). At high solution concentrations, cyanide polymer may form a dark brown precipitate.

Saponification (Hydrolysis)

Cyanide normally reacts with water to form ammonia and formate. In an alkaline solution, the products of saponification are formate salts and volatile ammonia. In an acidic solution, the products of this process are formic acid and ammonium salts. These reactions occur very slowly in solutions at low temperatures. The importance of these reactions in ponds in cold climates may be significant only in waters exposed for extended periods. The reaction rate between cyanide and water increases exponentially with increasing temperature. It is sometimes possible to promote higher temperatures in ponds such as by using black plastic as a liner in shallow ponds to absorb sunlight.

Cyanide Leaching Operations

Cyanide leaching operations include heap leaching and vat leaching systems. Heap leaching tends to be cheaper to build and operate, but higher rates of recovery inherent in vat leaching for some operations may justify the greater expense. The underlying chemistry of both types of processes is essentially the same.

Heap Leaching

Cyanide heap leaching systems are usually relatively simple in design and construction. Figure 2 shows a typical free-draining heap leaching system. Typical heaps may range from 1,000 to 2,000,000 or more tons and be stacked from 10 to 70 feet high, depending on the permeability of the ore. A small pile would occupy as little as a few thousand square feet; a large pile can be tens of acres. Ore may be obtained from virgin rock sources, from waste rock dumps, or from mill tailing piles. The lower limit of an ore grade which can be leached is contingent on a number of factors, including volume of the heap, efficiency of the process, and the market price for recoverable metals. Ore may be leached from an individual heap for one

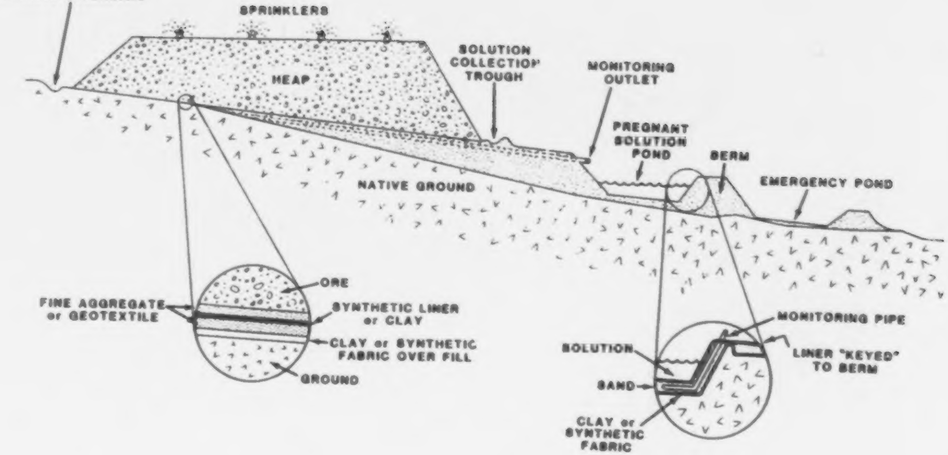

RUNOFF DIVERSION
SPRINKLERS
HEAP
SOLUTION COLLECTION TROUGH
MONITORING OUTLET
PREGNANT SOLUTION POND
BERM
EMERGENCY POND
NATIVE GROUND
FINE AGGREGATE or GEOTEXTILE
ORE
SYNTHETIC LINER or CLAY
CLAY or SYNTHETIC FABRIC OVER FILL
GROUND
MONITORING PIPE
SOLUTION
LINER "KEYED" TO BERM
SAND
CLAY or SYNTHETIC FABRIC

Figure 2. Generalized cross section of a heap leach.

to several leaching seasons, until metals recovery is no longer economical. Leaching seasons, normally referring to the period of unfrozen conditions, vary considerably. In cold climates, a season may be 3 to 4 months; in warmer climates, leaching can take place during the entire year.

A project starts with the identification of an ore body or other material which has been determined to be amenable to cyanide leaching. Construction normally begins by the stripping of topsoil or other suitable material (if the plan of operations require salvage). Earthwork necessary to prepare a base pad, depending on topography, may involve only minor grading on level sites to large cut and fill slopes in steep terrain. Finished pads usually have slopes from 2 to 10 percent to promote internal drainage. Earthwork may also be necessary to construct process ponds and safety ponds. Liners for pads and ponds are then installed. Pad liners may consist of natural materials (clays), synthetic membranes, or asphalt. Solution ponds are usually lined with a synthetic membrane.

Heaps may be loaded directly by end dumping from trucks or by conveyor stacking. It is generally desirable to minimize the amount of compaction within the heap in order to maximize the infiltration potential of percolating solutions. Some ore types (notably volcanics) can be loaded with little or no crushing. Crushing may be necessary to increase the surface area of certain ores. Ores having high clay contents may require agglomeration. Agglomeration is a process whereby cement and/or other agents are used to bind the finer fractions together, thus improving the percolation characteristics of the heap. It involves addition of water and a binding agent, such as cement, and mechanical tumbling to form pellets. Pellets are allowed to cure prior to loading on the pad. Some pads are designed to accommodate multiple loadings and use of the pad. In such systems, the pad is loaded, leached, rinsed and the spent ore is removed to a tailing disposal area. The process is then repeated.

Leaching solution is mixed in a make-up (barren) pond or suitable tank by just adding caustic to water at a rate of 50 pounds caustic per 1,000 gallons of water, resulting in a solution concentration of about 0.5 percent. Sodium cyanide is then added via direct dumping or a mechanical feed system at a rate of about 0.5 to 1.5 pounds per ton of solution (about 240 gallons) which produces a solution concentration ranging from about 250 ppm to 700 ppm NaCN, or 125 ppm to 350 ppm free cyanide.

The rate of consumption of sodium cyanide at leaching operations depends on the type of ore, pyrite content, porosity, type of system, control of solution pH, economics, and other factors. Sodium cyanide consumption may range from 0.1 to three pounds per ton of ore, but typical consumption probably ranges from about one-half to one pound per ton of ore. Similarly, the consumption rate for caustic varies. Typical consumption rates range from about two to three pounds per ton of ore.

Process solutions are piped from barren solution ponds to the heaps. Steel pipe with welded seams, polyethelene, or PVC pipe can be used. All piping must be sufficiently competent to withstand a system's working pressures. Piping should also be situated in protected areas such that leakage will be readily collected and contained. Heaps are sprayed with a solution of sodium cyanide (barren solution) which percolates through the heaped ore. Solution is sprayed onto heaps often with ordinary landscape-type sprinklers. Typical solution application rates range from 5 to 80 gallons per day per square foot. Solution is collected as "pregnant" solution in lined channels at the toes of heaps and directed to ponds or tanks. Ponds help control a system's solution balance and allow sediments to settle. Pregnant solutions are processed in carbon adsorption columns and/or zinc precipitation units. In typical heap leach operations, process solutions are recycled.

If carbon adsorption columns are used, once the carbon in the columns becomes "loaded"—from 200 to 800 ounces metal per ton of carbon—the carbon is then stripped. A caustic-cyanide solution is commonly used to strip the metals from the carbon. With zinc precipitation units, various techniques are used to separate gold and silver from zinc, but in most of these, the zinc is usually consumed in the process. The granulated carbon however may be reused, thereby enhancing the economics of the process. The removed precious metals are then generally processed into dore bars for shipment. There are many individual refinements and variations of this process, but they are all fundamentally similar.

Vat Leaching

Vat leaching systems exhibit a wide range of design, from processing systems which are in essence contained heap leaching systems, to more elaborate processes including carbon-in-pulp and air agitation (pachuca tanks). System capacities may range from several tons to several thousand tons per day. These systems may function as primary extraction processes or as secondary processes for the recovery of precious metals from industrial by-products. In some ores gold may be complexed with other elements or bound in a sulfide mineral and not readily amenable to cyanidation. For example, ores containing gold complexed with tellurium generally requires an initial flotation and concentration process for successful recovery. Subsequently, the concentrates may then be roasted to oxidize the tellurides. The concentrates then become amenable to cyanide extraction in a vat-leaching system. In each of these systems employing cyanide, the basic process reactions are virtually identical to those previously described.

Vat leaching systems may be open or enclosed. In mountainous areas or other cold climates, housing a system inside a building permits year long leaching. In vat leaching, ore is nearly always crushed (and often agglomerated) prior to loading into concrete or steel vats. Solution concentration strengths tend to be higher (1,000 ppm or greater free cyanide equivalent) and the process cycling times lower relative to heap leaching. Increased efficiency and recovery rates are inherent with vat leaching systems, as are capital and operating expenses. Large, open ponds for solution make-up and storage may not be necessary for vat leaching operations. Large tailing disposal areas, however, may be required in addition to process areas. Heaps are often reclaimable in-place, although the area covered by a heap may be quite large. Cyanide pretreatment may be included in a wetting and agglomeration step. In large operations, conveyors or slurry pipes are used to transfer materials throughout the system.

Leaching solution is normally prepared in steel tanks or small ponds and transferred to vats where the ore may be sprinkled as in heap leaching, or flooded. Vats are made of steel or concrete. Large vat leaching operations may accommodate several thousand tons of ore, and several vats may be operated concurrently. Ore may be leached for one or more days. Pregnant solution is circuited from the vats to carbon adsorption and/or precipitation units as described previously for processing of pregnant solution from heaps.

Once maximum recovery has been achieved, the vats are drained and rinsed with water to recover residual cyanides and metals. Some operations treat and discharge waste barren solution. The process solution may, however, be recycled to other vats awaiting leaching, and the process will then be repeated following adjustments to the chemistry and volume of the process solution. A certain amount of moisture is retained in the ore when the vats are drained.

Spent ore is removed and deposited in tailing impoundments. Tailing discharged from cyanide processing plants may be expected to contain residual free and complexed cyanides. Concentrations depend on the nature of actual processes, mineralogy of ores, and any treatment of wastes prior to discharge. Tailing may be disposed of in slurry form or as dewatered tailing which may resemble moist sand. Since tailing will often continue to drain after it has been placed in an impoundment subsequent to their deposition, and since an open impoundment itself will intercept precipitation, impoundment areas are often designed and constructed with a sloping base and, where appropriate, covered with a low permeability liner to allow complete dewatering of the tailing, and the collection of drainage for necessary monitoring and/or treatment prior to discharge.

2

Environmental Resources

The vast majority of well designed, properly operated cyanide leaching operations have little or no lasting effects on the environmental resources of their respective project areas. Protection of ground and surface waters is usually the most significant concern which may require specific consideration in project design, operation, or reclamation, and may require in some cases at existing projects special remedial measures. This chapter provides an introduction to the potential for hydrologic concerns associated with cyanide leaching, and a brief overview of concerns pertaining to other environmental resources.

Hydrology

Collectively, most environmental problems from cyanide operations are related to water quality. In considering potential impacts from cyanide leaching operations, a broad distinction can be made between areas which are humid and areas which are arid. Firm definitions of what constitute humid or arid regions do not exist. In general, areas where precipitation exceeds evaporation potential can be considered humid and areas where evaporation potential exceeds precipitation can be considered arid. This is usually expressed in terms of the precipitation to evaporation ratio (P/E). In the United States, the 100th meridian is often thought of as the line of demarcation between the humid east (P/E > 1) and the arid west (P/E < 1). This meridian runs approximately through the middle of Nebraska and South Dakota. Elevation and other factors can affect P/E, and areas of high elevation in the Rocky Mountains, and in the Pacific northwest and Alaska, even though west of the 100th meridian, do exhibit P/E's greater than one.

Garner (1974) gives some general geologic and biologic attributes inherent to humid and arid regions. Humid regions may be broadly characterized as having a nearly continuous cover of vegetation, a variety of moisture-loving animals, well developed soils, and abundant surface and ground water. General geologic and biologic attributes inherent to arid environments include discontinuous cover of vegetation, weakly developed soils, a variety of animals adapted to low moisture conditions, exposed landscapes susceptible to wind and water erosion, and scarcity of ground and surface water. The climatic and hydrologic conditions existing in any area where a proposed or existing cyanide leaching operation is located will influence the types of questions and concerns which may be raised in an assessment of potential environmental effects.

In the western United States, precipitation patterns range widely in form and occurrence. Some areas typically receive moisture as slow but consistent showers generated from frontal storm systems. In other areas, the bulk of precipitation may come from just a few summer thunderstorms. The characteristics of storms tend to be regionally distributed.

The role of snowmelt in the design of open leaching operations in mountainous climates has probably not received adequate consideration. Recently, investigators researching reports of historic and supposedly intense short-term storms in mountainous areas have discovered some interesting evidence which may render some of the assumptions about mountain thunderstorms suspect. In the southern Rocky Mountains, for example, it has been generally thought that the intensity of thunderstorms increases with increasing elevation. Much of the evidence for this conclusion was based on geomorphic interpretations of landform origins and limited eye witness accounts. Actual data from meteorological stations has been lacking. Research conducted by Elliott et al. (1982) and Jarrett and Costa (1983) differentiating snow and rain flood peaks on some foothills streams in Colorado have shown that floods caused by snowmelt occur predominantly at elevations above about 7,500 feet; at elevations below 7,500 feet, rainfall-produced floods predominate. The applicability of this information outside Colorado is limited, but it does indicate the obvious need to assess the nature and occurrence of storms in evaluating runoff and storage criteria for cyanide leaching operations.

It is important also to note that in some areas of winter snow accumulation, much of the annual snowmelt may occur during just a few weeks each spring. Since snowmelt generally occurs at a time of year when the underlying ground is frozen, the effective percentage of runoff from melting snow tends to be very high. Underestimating runoff volume from snowmelt can seriously compromise the ability to maintain on-site structures. Estimating design flows is a complex subject and is generally done by qualified professionals.

In areas where snowmelt may be significant, consideration must be given to possibility of a large precipitation event occurring in conjunction with snowmelt. Provision may be necessary to allow sufficient storage capacity for snowmelt as well as storm runoff, or for other measures to reduce snowmelt contributions. One technique which has been effective on some smaller heaps is a covering of plastic film during winter to shed spring runoff to adjacent diversion ditches.

Arid areas, especially areas where slopes are steep or where vegetation cover may be sparse, are generally more susceptible to the erosive forces of precipitation and runoff than more moist areas. Important precipitation and runoff considerations which must be accounted for in cyanide leaching operations include runoff and sediment storage capacity of impoundments, sizing of diversion structures, and the assessment of potential on-site and off-site effects due to spills or breaches. In humid areas, periodic discharges may be unavoidable, and treatment of effluents may be required for compliance with water quality standards.

Surface Water Quality

A basic premise of this handbook is that cyanide leaching systems should be designed as closed systems to the extent possible. The transitory and reactive nature of cyanide solutions makes it very difficult to predict all of the environmental consequences of a spill.

Several large fish kills have been recorded due to cyanide spills from industrial plants and waste water treatment facilities. Other industrial accidents involving cyanide have claimed wildlife and livestock, but to date, no human death or illness has been attributed to cyanide in water supplies.

The possible effects of a cyanide solution spill will be affected by solution concentrations and volumes, status of the event relative to aquatic life and other users of the surface and near surface receiving waters, and environmental conditions at the location of the spill. As an example, streams which traverse abandoned cyanide processed mill tailing may be chronically polluted with free cyanide. Although such pollution is undesirable, it must be realized that a cyanide spill in such a stream would tend to be of less consequence (if it did not significantly increase the cyanide concentration in the stream) than would be the consequences of a similar spill in pristine waters.

Disregarding system leaks and controlled discharges, spills most often occur as a result of the inability of systems to contain runoff. Interception of precipitation and surface runoff by impoundments containing cyanide decreases cyanide concentrations in the impounded solutions. In the event of a precipitation event which results in the overtopping of an impoundment, the resultant degradation of receiving waters is a function of the quality and rate of flow of those receiving waters relative to the quality and volume of the discharge from the impoundment. Such incidents are typically associated with periods of very high stream flows.

The possible combinations of circumstances and effects of a spill are exhaustive, and considerable discretion in assessing the possible impacts must be exercised on a site-by-site basis. A solution spill has potential impacts ranging from disastrous to inconsequential. The possible impacts on aquatic life in a receiving stream would not be uniform. A later section elaborates on some of the ecological issues and levels of concentrations affecting certain organisms. Fish, and in particular trout, appear to be among the most sensitive of higher organisms to free cyanide. In comparison, the acute toxicity of free cyanide to man and many other mammals is at least several orders of magnitude above the levels which may threaten fish. Water quality standards tend to reflect this fact. Plants are much less susceptible to cyanide than are animals, and in fact, the compound calcium cyanimide ($CaCN_2$), which contains about 21 percent nitrogen, has been used extensively as fertilizer, although its use is not as prevalent as it once was.

In environments where effluents containing cyanide may be discharged, water quality criteria of the receiving stream must be met. The Clean Water Act of 1977, as amended, allows for scientific assessment and recommended criteria to be established by the EPA limiting the maximum acceptable levels of pollutants in ambient waters. Such water quality criteria associated with specific stream uses when adopted as state water quality standards become enforceable maximum levels. The existing federal guidelines which give the current maximum levels for cyanide are shown in Table 3.

Table 3. Federal criteria for cyanide in water.

Parameter	Magnitude µg/ℓ	Duration	Frequency
Freshwater aquatic life[†]			
Acute	22.0	1 hr	once/3yrs
Chronic	5.2	4 day	once/3yrs
Saltwater aquatic life[†]			
Acute	1.0	1 hr	once/3yrs
Potable water[‡]	200 (free cyanide)		

[†] 50 FR, July 29, 1985. Average concentrations of total cyanide for the specified durations.

[‡] 45 FR 79331, November 28, 1980. Value identical to existing drinking water standard.

The reader will note an apparent paradox in the data given in Table 3 for aquatic life criteria giving the values in terms of "total cyanide" when compared to the discussion further in this chapter which addresses "free cyanide" as the important index of toxicity to aquatic life. The EPA qualifies this situation in the following manner:

> EPA believes that a measure such as free cyanide would provide a more scientifically correct basis upon which to establish criteria for cyanide. The criteria were developed on this basis. However, at this time, no EPA approved methods for free cyanide [analysis] are available to implement the criteria through the regulatory programs of the Agency and the States. The Agency is considering development and approval of methods for free cyanide. Until available, however, EPA recommends applying the criteria using the total cyanide method. These criteria may be overly protective when based on the total cyanide method (50 FR, 30790, July 29, 1985).

Much of the attention in regulating cyanide leaching operations has historically focused on cyanide. It is important to note that other parameters may have an equal or possibly greater impact in surface waters, particularly if long-term drainage from tailing were to occur. Such contaminants may include trace elements, major ions, and other chemicals introduced during the mining and milling processes.

The process of agglomeration and/or grinding of ore prior to processing serves to increase access to the desired minerals. Other minerals associated in the ore are also solubilized and complexed during the leaching operation. Besides the precious metals, notably copper, zinc, iron, and possibly cadmium, nickel, mercury, arsenic, and lead may be present in solution to one degree or another as metallocyanide complexes, metal ions (more than one specie of some metals may be present) and other compounds. Other impurities such as sulfur products, obtained from sulfide minerals in the ore, sodium by-products, and chemicals used in mining and other parts of the beneficiation system (where present) are present in the process waters.

In most of the operational systems employing cyanidation, much of the barren solution is recycled back through the system. There are a number of reasons for this, including the incomplete extraction of the precious metals, additional leaching potential of the solution, and desire to conserve water in those areas where it may be scarce. However, the continued use of process waters accumulates unwanted minerals and other impurities to the point where they hinder the dissolution and precipitation of gold (Huiatt et al. 1983). Some systems must thus discharge some of the solution and introduce new water into the process. Open heap leaching operations generally recycle barren solution for additional leaching without discharging, unless the processing operation exists in a high precipitation area. Heap-leaching operations typically have a substantial loss of water from the system due to evaporation from the spraying process and from open ponds. Make-up water introduced into the system to maintain the water balance of such operations may serve, in some cases, to help reduce the build-up of solution contaminants. Undoubtedly, evaporation tends to concentrate many of the constituents in solution at such operations. But, precipitation of some of the metals probably occurs because the solution pH normally changes at various points within the system.

Many types of intermediate and final reactions occur in process solutions during leaching operations and upon site decommissioning. Many of these reactions are governed by changes in pH, ion substitutions, relative concentrations of constituents, chemical additions to neutralize cyanides, temperature, amount of oxygen present, and sunlight. As discussed in an earlier section, metallocyanide complexes have a wide range of stability. The metallocyanide complexes and other metal compounds have a broad spectrum of solubility and mobility. The mobility of metals and anions (such as sulfate) may be quite variable under the conditions inherent to surface- and ground-water environments. It is thus difficult to depict the behavior of ions in a general way because of the number of species and their variable and dynamic natures. This matter is further complicated by the fact that environmental conditions may change significantly over short distances. Despite these problems, a few attempts have been made to empirically estimate the general relative mobilities of certain elements. Table 4 is a compilation of the relative mobilities of some elements in the secondary environment based on oxidizing, acid, neutral, and reducing conditions.

With the great number of variables and possible chemical environments and transitional environments involved, an assessment of possible pollutants which may be expected as a result of spill are beyond the scope of this handbook. Monitoring programs, including the collection and assessment of baseline data, would thus be the most practical way to assess operations and the presence of possible pollutants from leaks, spills or discharges. Data obtained from monitoring must be interpreted. This procedure involves comparison with baseline data, identification of anomalies, consideration of possible seasonal influences and flow rates of wells and streams, trends, and other considerations to determine if additional monitoring is needed or if a possible problem may exist.

Table 5 is a summary of EPA ambient water quality criteria for various metals relative to freshwater aquatic life. It is important to note that the term "criterion" is not synonymous with the term "standard". Criteria do not have direct regulatory use but may form the basis for judgment in federal and state regulatory programs regarding water quality. With respect to organisms in the aquatic environment, the term has come to mean a concentration of a constituent that when not exceeded, will not unacceptably affect an organism. Furthermore, it should be understood that certain bodies of water may naturally exceed some criteria, and organisms may be locally adapted to that water quality. Conversely, there may be locally important species that are very sensitive to levels of a constituent below the published criterion.

Water hardness influences the relative toxicity of many heavy metals and the criteria values given in Table 5 reflect this by establishing some of

Table 4. Relative mobilities of various elements in the secondary environment.

RELATIVE MOBILITIES	ENVIRONMENTAL CONDITIONS			
	Oxidizing	Acid	Neutral to alkaline	Reducing
VERY HIGH	Cl, I, Br S, B	Cl, I, Br S, B	Cl, I, Br S, B Mo, V, U, Se, Re	Cl, I, Br S, B
HIGH	Mo, V, U, Se, Re Ca, Na, Mg, F, Sr, Ra Zn	Mo, V, U, Se, Re Ca, Na, Mg, F, Sr, Ra Zn Cu, Co, Ni, Hg, Ag, Au	Ca, Na, Mg, F, Sr, Ra	Ca, Na, Mg, F, Sr, Ra
MEDIUM	Cu, Co, Ni, Hg, Ag, Au As, Cd	As, Cd	As, Cd	
LOW	Si, P, K Pb, Li, Rb, Ba, Be, Bi, Sb, Ge, Cs, Tl	Si, P, K Pb, Li, Rb, Ba, Be, Bi, Sb, Ge, Cs, Tl Fe, Mn	Si, P, K Pb, Li, Rb, Ba, Be, Bi, Sb, Ge, Cs, Tl Fe, Mn	Si, P, K Pb, Li, Rb, Ba, Be, Bi, Sb, Ge, Cs, Tl Fe, Mn
VERY LOW TO IMMOBILE	Fe, Mn Al, Ti, Sn, Te, W Nb, Ta, Pt, Cr, Zr, Th, Rare Earths	Al, Ti, Sn, Te, W Nb, Ta, Pt, Cr, Zr, Th, Rare Earths	Al, Ti, Sn, Te, W Nb, Ta, Pt, Cr, Zr, Th, Rare Earths Zn Cu, Co, Ni, Hg, Ag, Au	Al, Ti, Sn, Te, W Nb, Ta, Pt, Cr, Zr, Th, Rare Earths S, B Mo, V, U, Se, Re Zn Cu, Co, Ni, Hg, Ag, Au As, Cd Pb, Li, Rb, Ba, Be, Bi, Sb, Ge, Cs, Tl

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Adapted from Levinson (1980)

Table 5. Water quality criteria for various metals for freshwater aquatic life.

Parameter	Magnitude (in µg/liter)	Duration	Frequency
Arsenic III[1]			
Acute	360	1 hr	once/3yrs
Chronic	190	4 day	once/3yrs
Cadmium[1]			
Acute	$e^{(1.128[\ln(\text{hardness})]-3.828)}$	1 hr	once/3yrs
Chronic	$e^{(0.7852[\ln(\text{hardness})]-3.490)}$	4 day	once/3yrs
Copper[1]			
Acute	$e^{(0.9422[\ln(\text{hardness})]-1.464)}$	1 hr	once/3yrs
Chronic	$e^{(0.8545[\ln(\text{hardness})]-1.465)}$	4 day	once/3yrs
Iron[2]	1000	(not to exceed value at any time)	
Lead[1]			
Acute	$e^{(1.273[\ln(\text{hardness})]-1.460)}$	1 hr	once/3yrs
Chronic	$e^{(1.273[\ln(\text{hardness})]-4.705)}$	4 day	once/3yrs
Mercury[1]			
Acute	2.1	1 hr	once/3yrs
Chronic	0.025	4 day	once/3yrs
Nickel[3]			
Acute	$e^{(0.8460[\ln(\text{hardness})]+3.3612)}$	1 hr	once/3yrs
Chronic	$e^{(0.8460[\ln(\text{hardness})]+1.1645)}$	4 day	once/3yrs
Silver[4]			
Acute	$e^{(1.72[\ln(\text{hardness})]-6.52)}$	(not to exceed value at any time)	
Chronic	See[5]		
Zinc[3]			
Acute	$e^{(0.8213[\ln(\text{hardness})]+0.8141)}$	1 hr	once/3yrs
Chronic	$e^{(0.8213[\ln(\text{hardness})]-0.1541)}$	4 day	once/3yrs

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[1] 50 FR, July 29, 1985. Average concentrations for the specified durations.

[2] Quality criteria for water, 1976, U.S. EPA, Washington, D.C.

[3] Proposed, but not adopted at time of writing.

[4] 45 FR, November 28, 1980.

[5] Insufficient data but levels as low as 0.12 µg/l may produce chronic effects.

the criteria by equations in terms of hardness. Other things being equal, it has been shown that the toxicity of certain metals decreases with increasing hardness of the water.

Criteria for metals listed by EPA are based on methods of analyses for total recoverable metals. This method reports the total sum of all species of the metal present. However, as stated in the information given above, certain species of the same metal may have widely different behavior. The EPA addresses this issue for a number of the revised criteria for metals as follows:

> EPA believes that a measurement such as "acid-soluble" would provide a more scientifically correct basis upon which to establish criteria for metals. The criteria were developed on this basis. However, at this time, no EPA approved methods for such a measurement are available to implement the criteria through the regulatory programs of the Agency and the States. The Agency is considering development and approval of methods for a measurement such as "acid-soluble". Until available, however, EPA recommends applying the criteria using the total recoverable method. This has two impacts: (1) Certain species of some metals cannot be analyzed directly because the total recoverable method does not distinguish between individual oxidation states, and (2) these criteria may be overly protective when based on the total recoverable method (50 FR, 30784-30796).

Ground-water Quality

Much of the information presented in the foregoing discussion of the surface water environment is applicable to ground-water systems. One significant obvious difference is that the relative effects of dilution may not be as apparent as with surface waters, owing to the overall slower rates of ground-water movement.

In some states, many public water systems have ground-water sources. No mandatory drinking water standards for cyanide currently exist, but the federal water quality guideline is 0.2 ppm.

Local and regional geology and climatic conditions control the ground-water regime. Ground water may be tributary or non-tributary to surface waters. An aquifer may be open, such as in alluvial gravel systems found along many valley floors, or confined, such as sandstone aquifers isolated from the surface by adjacent impermeable beds. Available data to assess the impacts of cyanide and its chemical behavior in ground water is lacking, and the overall effects may only be addressed in a qualitative fashion. The routes by which solutions from a leaching system could enter ground-water systems include leaks from processing systems and spills entering streams. Considerable discretion must then be given to the siting and hydrologic characteristics of a project area.

A leaching heap is designed to be a free draining mass. Consequently, the hydraulic head developed in most piles is not very significant. In the event of a tear in an underliner, the leakage rate would primarily be controlled by the size of the opening and the permeability of the underlying material. In ponds, however, a considerable solution head can develop (depending on the depth of solution) and the rate of solution loss may be substantial for even small openings. As presented earlier, cyanide may be attenuated in some soils due to characteristics in pH, ion exchange, organic constituents, and other factors. In summary, a host of elements may control whether a cyanide solution would have an impact in the event of a spill or leakage in the system, and the following factors should be considered at least in a qualitative fashion in the siting and design considerations of the facility:

1) Nature of adjacent land uses.
2) Geologic and hydrologic environments, ground waters and surface waters and the users of these systems (e.g., nearby wells).
3) Character of aquatic communities.
4) Volumes and chemistry of receiving waters.
5) Nature of the soil including chemistry, pH, organic content, thickness, permeability.

6) Character of wildlife communities and comparative abundance of natural water bodies. For example, in arid areas, open ponds and solution channels may have an increased attraction to wildlife under stress despite objections to unfavorable alkalinity levels.
7) Size of the operation.

Aquatic and Terrestrial Wildlife

Of the higher organisms, fish—particularly certain trout species—appear to be the most sensitive to concentrations of free cyanide in water, including the complexed cyanides converted to free cyanide through photodecomposition, dissociation, and ionization in surface waters. Considerable research has been conducted regarding the acute and chronic toxicities of free cyanide to fresh-water organisms by Doudoroff (1956 and 1976), Oseid and Smith (1979), Smith et al. (1979), and many others. Less information is available on the acute and chronic toxicity of free cyanide to saltwater organisms. Table 6 presents cyanide concentrations at which acute toxicity symptoms are exhibited by various aquatic species. Table 7 presents similar information with respect to chronic toxicity symptoms. Warm water species tend to be the most resistant. Free cyanide concentrations of above 0.2 ppm are rapidly fatal to most fish, with concentrations of between 0.05 to 0.2 ppm showing eventual fatality to juveniles of the more sensitive species. Preliminary work suggests that some marine species are at least as sensitive as freshwater organisms (Table 6).

The chronic effects of low levels of free cyanide on freshwater fishes is quite varied. Doudoroff et al. (1966) report that the swimming ability of salmonid species may be rapidly and permanently impaired at concentrations as low as 0.01 ppm. Reduced long term growth and survival are among the other chronic effects in various fish species which have been reported (Lind et al. 1977). Life cycle tests were performed on two freshwater invertebrates, an isopod (*Asellus communis*) and a scud (*Gammarus* pseudolimnaeus) by Oseid and Smith (1979) who found chronic toxic values for free cyanide to be 0.034 ppm and 0.018 ppm, respectively.

Information about the effects of cyanide on terrestrial wildlife is not as complete, and existing data are subject to some interpretation. As given by Gosselin and Gleason (1976), the mean lethal dose of cyanide ingested by mouth in humans is in the range of 50 to 200 mg, equivalent to about 1 to 3 mg/kg. The level reported to be toxic to mice is 3 mg/kg and 0.1 mg/kg for birds (DiPalma 1971).

Large but sublethal doses of sodium cyanide (0.5 to 2.0 mg/kg) were administered to dogs once or twice per day over a 15 month period in a study conducted by Hertting (cited in Smith 1980). Acute toxic symptoms of cyanide poisoning would usually appear in the animals but they are reported to have fully recovered in a very short time—within about 30 minutes. From this work and other studies, including work conducted by Howard and Hanzal (1955), Hayes (1967), and the American Cyanimid Company (1959), it has been concluded that rather large but periodic sublethal doses of cyanide may be tolerated by some animals for extended periods. But an extensive amount of evidence is now available to suggest long term adverse effects of cyanide in humans and other animals consuming cyanide in food or medicines (Vennesland et al. 1981).

Heap leaching operations may contain solution concentrations of about 500 ppm sodium cyanide (equivalent to about 250 ppm free cyanide). The working solution in a vat leaching system may contain substantially higher concentrations. A properly operated cyanide leaching facility should pose little danger to nearby wildlife in terms of hazard due to cyanide poisoning. Releases of cyanide into receiving surface waters and subsequent degradation or loss—in all likelihood temporary—of fisheries are generally the most probable threat.

Table 6. Acute toxicities of cyanide to aquatic animals (selected data).

Species	Method[§]	LC_{50} or EC_{50}[†] (µg/l)	Species mean acute value* (µg/l)
Freshwater species			
Snail *Physa heterostropha*	S, U	432	432
Cladoceran *Daphnia pulex*	S, U	83	—
Isopod *Asellus communis*	Ft, M	2,326	2,325
Amphipod *Gammarus pseudolimnaeus*	Ft, M	167	167
Stonefly *Pteronarcys dorsata*	Ft, M	426	426
Rainbow trout (juvenile) *Salmo gairdneri*	Ft, M	65	44.73
Brook trout (juvenile) *Salvelinus fontinalis*	Ft, M	52	—
Atlantic salmon (juvenile) *Salmo salar*	R, M	90	90
Fathead minnow (juvenile) *Pimephales promelas*	Ft, M	128	125.1
Bluegill sunfish (juvenile) *Lepomis macrochirus*	Ft, M	126	99.28
Yellow perch (juvenile) *Perca flavescens*	Ft, M	107	92.64
Saltwater species			
Mysid *Mysidopsis bahia*	Ft, M	113	113
Amphipod *Ampelisca abdita*	S, U	704	995.9
Rock crab (larva) *Cancer irroratus*	Ft, M	5.7	4.893
Winter flounder *Pseudopleuronectes americanus*	S, U	372	372

Source: **EPA 440/5-84-028, January, 1985**

[§] S = static; R = renewal; Ft = flow-through; U = unmeasured; M = measured

[†] LC_{50} = concentration lethal to 50% of tested organisms

EC_{50} = concentration at which a specified effect is observed in 50% of tested organisms

*Results expressed as free cyanide as CN

Table 7. Chronic toxicities of cyanide to aquatic animals (selected data).

Species	Test[§]	Limits[†] (µg/l)	Chronic value[†] (µg/l)
Freshwater species			
Isopod *Asellus communis*	LC	29-40	34.06
Amphipod *Gammarus pseudolimnaeus*	LC	16-21	18.33
Brook trout *Salvelinus fontinalis*	LC	5.6-11.0	7.849
Fathead minnow *Pimephales promelas*	LC	13.3-20.2	16.39
Bluegill sunfish *Lepomis macrochirus*	ELS	9.3-19.8	13.57
Saltwater species			
Mysid *Mysidopsis bahia*	LC	43-113	69.71
Sheepshead minnow *Cyprinodon variegatus*	ELS	29-45	36.12

Source: EPA 440/5-84-028, January, 1985

[§] LC = life cycle or partial life cycle; ELS = early life cycle;

[†] Results expressed as free cyanide as CN

The location of a facility itself can be of some consequence to wildlife. Where protected species are involved, concerns for wildlife protection may justify substantial alterations of a proposed operation. Such may also be the case where an operation is proposed in a critical habitat for an important game species, such as breeding grounds, migratory routes, or winter range. Mitigation measures may include curtailing operation to daytime hours only, controlling speed limits on access roads, suspending operations during a particular season, carpooling of the workforce to reduce traffic, and construction of fences.

It should be recognized that in most instances a cyanide leaching operation should be considered only a temporary disruption of wildlife habitat, and that with proper reclamation at the end of operation, wildlife values can often be enhanced. Benefits can particularly be realized in cases where abandoned waste dumps are developed for leaching and subsequently reclaimed, especially sites where acid drainage is a problem.

Other Environmental Resources

In developing a complete operation plan for a cyanide leaching facility, the attributes of a site's soils as plant growth media should be evaluated. This can be accomplished using soil survey information in conjunction with laboratory analyses of soil samples. Reliable soil survey information is not always available. The U.S.D.A. Soil Conservation Service (SCS) has surveyed and mapped many areas of the United States. SCS soil survey information is free upon request. Federal land management agencies such as the U.S. Forest Service and the Bureau of Land Management often may have soils information available for a particular area.

Soils information from these federal agencies may be somewhat limited in detail. It may be advisable for a developer or operator to conduct additional survey work in order to obtain soils information that specifically accommodates the needs of the project. Such work may include sampling of soils for laboratory analysis. For contracted soil survey work, a map scale should be specified. Base maps or aerial photographs of the project site at a scale of one inch to 400 feet or larger are typically used for mining projects. At this scale, units of one-half acre can be delineated. A more detailed account of using soil survey information is presented by Trenholme (1982).

Regulations governing cyanide leaching operations in some states require that suitable topsoil material be stripped and stockpiled prior to any subsequent site development. Some states such as Wyoming are quite specific in the regulations and/or guidelines about what constitutes suitable topsoil material. At some operations, the environmental or engineering benefits of salvaging topsoil may not warrant the expense.

Cyanide hazard per se is of no particular threat to vegetation except in instances of spills which may result in the loss of vegetation in the immediate vicinity. Vegetation which has been affected by cyanide may exhibit a bluish color.

As with any other mining or heavy construction operation, site vegetation will be disturbed by cyanide leaching operations. As such, if a site proposed for development is known or suspected habitat for any protected plant species, a survey to document the presence or absence of such species should be conducted. If such species are present, adequate mitigation may be proposed to allow development to continue. A vegetation inventory also serves the reclamation planner in selecting appropriate species for revegetation.

Most of the significant environmental consequences of cyanide leaching operations are manifest in the areas of hydrology which is extensively discussed in this handbook. Some operations, however, pose special needs for environmental assessment in technical areas usually receiving only routine cursory consideration for more typical operations. Such operations may be of particular concern to the National Park Service because of unique resource values associated with the lands managed under NPS stewardship. Air quality, archeology, socioeconomics, visual resources, and land use (including aesthetic issues) are potentially critical environmental issues for any type of industrial development on or near NPS lands in certain circumstances. In evaluating such issues, it is important to appreciate complexities created by the interactions between resources. Fugitive dust, for instance, may not be critical for a particular operation in terms of established air quality standards, but may pose significant problems in terms of visual impact. Noise and lights may not always be deleterious to recreational values, but may cause problems for important wildlife species. A proposed development may be viewed as a potential socioeconomic benefit in an area affected by a depressed mining industry; the same development may be viewed as a threat to perceived quality of life in another area more economically dependent on agriculture or tourism. The resolution of conflicts of these sorts is the most significant challenge to the process of environmental assessment.

3

Environmental Safety and Control

This chapter discusses environmental safety and control at cyanide leaching operations. Emphasis is given to practical, operational aspects of environmental safety and control. It must be kept in mind, however, that operating conditions can vary considerably from project to project, and site specific exceptions to the generalized information as given in this handbook will occur under actual operating conditions.

A word of caution is also appropriate. Information in this chapter and throughout this handbook derives from a number of professional disciplines. This handbook is not intended as a do-it-yourself instruction manual for amateurs who want to try their hand at cyanide leaching. Information given in this handbook can be no substitute for competent professional expertise in engineering and scientific disciplines necessary for the safe construction and operation of a cyanide leaching project.

Cyanide Toxicology

Cyanide may be readily absorbed by inhalation, ingestion of contaminated food and water, and absorption through the skin. Cyanide is rapidly distributed to all body tissues in the blood (Smith 1980). With sublethal exposures, cyanide detoxification will occur naturally in time by the conversion in the kidneys of cyanide to the less toxic thiocyanate form (deDuve 1955).

Inhaled hydrocyanic acid gas rapidly diffuses into the bloodstream through the pulmonary epithelium, and depending on the concentration, the effects can occur quickly. Dudley et al. (1942) report that the inhalation of 270 parts per million (ppm) HCN gas is rapidly fatal. Table 8 lists some HCN concentrations in air and respective physiological responses in humans. The lethal amount of orally ingested alkali metal cyanide salts (e.g., sodium cyanide) is generally considered to be in the range of a 50 to 200 mg dose (Gosselin and Gleason 1976), about the size of a grain of rice. Potter (1950) gives a case in which hydrocyanic acid solution spilled on the bare hand of a person wearing a respirator. The person is reported to have lapsed into deep unconsciousness within five minutes of exposure, but cyanide inhalation was purported not to have occurred.

The toxicity of cyanide is in part due to its affinity for metals. Cyanide forms relatively stable complexes with ferric iron (Fe^{3+}), and to the extent such complexes remain stable in the body, the essential metabolic function of iron as an electron carrier is inhibited. More specifically, cyanide is a powerful inhibitor of the iron-bearing respiratory enzyme known as ferricytochrome oxidase, essentially causing asphyxiation at the cellular level (DiPalma 1971). A victim of acute poisoning gasps for air as if suffocating.

Table 8. Estimated HCN concentrations in air and human physiological responses.

Effects	Concentration (ppm)	
	(A)	(B)
Rapidly fatal†	270	300
Fatal After 10 min.†	181	—
Fatal After 30 min.†	135	—
Fatal After 0.5 to 1 hr., or Dangerous to Life †	110-135	100-200
Tolerated for 0.5 to 1 hr. w/o immediate or late effects	45-54	45-54
Slight symptoms after several hrs.	18-36	20-40
Odor threshold	—	2-5

†Assumes no first aid treatment given.

References:

(A) Prentis (1937), Dudley et al. (1942), Fassett (1963)
(B) NIOSH (1976).

As a toxicant, the most potent form of cyanide with respect to mammals is as HCN (Smith 1980). The cyanide anion (CN^-) is also toxic but is not as readily absorbed into the body (DiPalma 1971). The same is true for aquatic organisms (Doudoroff et al. 1966 and Smith et al. 1979). The cyanide anion can be readily converted to HCN in surface waters (Stephan and Gentile 1980). Thus, free cyanide concentration ($[HCN]+[CN^-]$) is probably the more reliable index of the toxicity of solutions, since the total cyanide concentration may also include other forms of cyanide such as variously stable metal complexes and organic compounds. Cyanide is a transient toxicant which, unlike many poisons, does not accumulate in organisms. There appears to be no evidence that cyanide is mutagenic, teratogenic or carcinogenic.

Worker Exposure Limits

The National Institute for Occupational Safety and Health (NIOSH) has recommended a standard for exposure in the workplace of 10 ppm HCN gas as the threshold limit/time weighted average for a normal eight hour work day. The Occupational Safety and Health Administration (OSHA) has ruled that the exposure limit for workers to cyanide in airborne particulates shall not exceed a time-weighted mean of 5 mg per cubic meter in any eight hour work shift of a 40 hour week. At mining operations, these standards are enforced by the Mine Safety and Health Administration (MSHA).

Numerous measurements of HCN concentrations in the air close to working heaps have shown levels of only 2 to 3 ppm (Heinen et al. 1978), near the odor threshold given in Table 8. The level of HCN concentrations at a large (≥1,000 tons per day), well ventilated, indoor heap-like vat leaching system in Colorado is reported to be consistently about 5 to 6 ppm.

The ability of individuals to detect low levels of HCN gas appears to be at least in part genetically determined. Some individuals can detect the odor of HCN while others may not under the same conditions. Cyanide leaching operations typically liberate small amounts of HCN gas as a result of acidification due to pyrite oxidation and carbonic acid displacement due to atmospheric carbon dioxide being dissolved in the solution during spraying. Consequently, the odor of HCN may be expected around an active heap. Under no circumstances, however, is apparent strength of HCN odor by itself an acceptably reliable indicator of presence or absence of HCN hazard. Inexpensive instruments are available for monitoring HCN concentrations in air (information about monitoring instruments is given at the end of this chapter). Monitoring devices should always be employed if there is the least suspicion of the presence of HCN hazard.

Symptoms and Treatment of Cyanide Poisoning

Because sodium cyanide is extremely poisonous, great care must be exercised in its handling. Poisoning may occur if cyanide-laden dust is inhaled or extended contact is made with the skin, particularly if cuts or abrasions exist. Symptoms of cyanide poisoning include reddening of the eyes, headaches, irritation of the throat, weakness of arms and legs, palpitation, giddiness, difficulty in breathing, collapse and convulsions, salivation, numbness, and nausea.

Immediate action is required in the event of possible cyanide poisoning. The following are some basic rules which should be observed for administering prompt and effective treatment to a victim overexposed to cyanide.

1) Remove victim from source of contamination.
2) Administer standard treatment procedures for cyanide poisoning.
3) Transport the victim to the nearest medical facility. It is prudent practice to notify such facility prior to commencement of operations in order that they have the necessary antidote in supply.

A more thorough plan of first aid and medical treatment is provided in the Du Pont publication at the end of this handbook, which should be consulted for more specific information. First aid should be required for all incidences of injury where cyanide may be involved. An adequate plan of action should be fully understood by all employees, and all personnel working around or with cyanide should be trained in first aid procedures, including cardiopulmonary resuscitation (CPR), which may be necessaary in the event of an emergency involving cyanide.

Emergency Response and Detoxification

Operations involving cyanide should have established contingency and emergency response plans. Such plans should clearly establish lines of authority within a response team, comprised of site personnel, specific priorities for corrective actions to be taken on the ground, and procedures for the notification of public authorities. Emergency response procedures should be practiced as part of a training effort to ensure effective implementation in the event of a real emergency. Contingency and emergency response plans and attendant training programs should be developed in detail on a project specific basis by experienced, qualified personnel. As appropriate, local law enforcement agencies or other authorities should be involved in the development of a contingency and emergency response plan.

Detoxification procedures outlined in this section are highlights only, and are not described in detail. This section is intended to provide an overview of the kinds of techniques which can be employed when emergencies occur. Some of these techniques can require considerable sophistication in the knowledge of the chemistry of cyanide, and the information provided here should never be utilized in an emergency in the absence of direct supervision by responsible, qualified personnel.

In the event of an actual or potential off-site release of cyanide, it is imperative that the proper authorities be immediately notified. Generally, this would be the agency or agencies in charge of regulating the operation and affected lands and other organizations specifically equipped to deal with chemical emergencies. A solution spill or mishap involving reagents may require prompt action to minimize environmental damage or reduce the possible threat to public health and safety. Accidents involving the shipment of chemicals should be reported immediately to the Chemical Manufacturers Association's Chemical Transportation Emergency Center ("CHEMTREC"). The specialist on duty will give the caller recommendations for controlling the emergency.

Telephone numbers for the various agencies should be readily accessible by personnel at the operation. It is recommended that the following organizations be contacted immediately if a cyanide solution spill were to occur:

- The state or local environmental agencies which regulate the operation.
- CHEMTREC (for shipping accidents) 1-800-424-9300.
- The Mine Safety and Health Administration (MSHA).

Spill Treatment and Handling

Spills which involve either solid sodium cyanide or cyanide-containing solutions must be appropriately handled and/or treated if necessary. Caution should be exercised in the cleaning up of dry sodium cyanide because of the potential for the inhalation of its dust and possible contact with the eyes and skin. When there is a potential for inhaling cyanide dust, a suitable dust respirator should be worn. Long clothing, boots, protective gloves and chemical splash goggles should be worn to help minimize the contact with the chemical during the clean up of dry chemicals. Rubber gloves should be worn when handling cyanide solutions. While investigating, neutralizing and controlling a release, a self-contained breathing apparatus should be used if cyanide has been exposed to other solutions, or if other conditions exist to increase the likelihood of the release of HCN gas.

Sodium cyanide spilled on the ground should be kept dry to help reduce its mobility and potential for generation of HCN gas. During a storm, spilled sodium cyanide can be covered with a plastic membrane or other suitable covering. In the event that sodium cyanide is spilled on the ground, it is recommended that the top layer of soil be removed. Where feasible, contaminated soil can be disposed of in a solution make-up pond or on a heap, thereby containing spilled cyanide within the process and allowing for at least partial cyanide recovery. An alternative is to clean up as much of the visible spilled sodium cyanide as possible and then to treat the affected area with a weak hypochlorite solution to destroy the formation of free cyanide. A 0.5 percent caustic soda solution (5 pounds per 100 gallons of water) applied to the contaminated area helps to maintain a high pH necessary for proper hypochlorite treatment (this process is addressed in further detail below). In any case, however, the ground should be treated where a contaminated area was wet or where solution has spilled.

Accidents involving spills of cyanide solution should be treated and contained within the processing system if at all possible. Obviously the magnitude of a spill will influence the type of action to be taken. Outside of small, on-site solution spills such as may occur from leaking pipes, many of the known incidents involving solution spills at cyanide heap leaching operations have been related to failure of solution ponds or tailing ponds to contain runoff. In the event of a possible breach of impoundment, pond solution should be treated if at all possible prior to any release in order to minimize environmental effects. There are a number of effective methods which may be used to destroy cyanides, but in an emergency situation the simplest are generally the most appropriate. If a release becomes inevitable, detoxification treatment of the presumptive effluent should begin as quickly as possible. Adequate supplies of detoxification reagents for emergency use should either be maintained on site or otherwise readily available from a known, reliable supplier.

There are two principal treatment methods for the emergency detoxification of cyanide solutions, alkaline chlorination and oxidation by hydrogen peroxide. Other methods are not as universally applicable. Alkaline chlorination is a process in which calcium or sodium hypochlorite is used under elevated pH conditions to oxidize free cyanide. Weakly-bonded cyanide complexes are also destroyed by alkaline chlorination. Sodium hypochlorite is the active ingredient in chlorine bleach. Hypochlorite is also sold in granular form for chlorinating swimming pools. The advantage of granular hypochlorite is ease of handling and storage. Alkaline chlorination results in the complete oxidation of free cyanide to carbon dioxide and nitrogen. It is a process which requires diligent control of the solution chemistry. A highly toxic compound, cyanogen chloride, is an intermediate reaction product formed in the alkaline chlorination process. Control of solution pH is critical since cyanogen chloride is only a short-lived byproduct at high pH, but at lower pH's cyanogen chloride gas is generated. This can be a concern especially when using large amounts of hypochlorite because the chlorination process produces hydrochloric acid. Cyanogen chloride gas may also be generated if solution concentrations of chlorine and cyanide are high enough even at elevated solution pH's. Du Pont recommends that solution concentrations of chlorine and cyanide not exceed 1 percent.

Initially, hypochlorite is added to a cyanide solution maintained at a pH of between 10 and 11. (At a pH of 12, chlorine reactivity decreases significantly.) Following a reaction period of 10 minutes or more at a pH of 10 to 11, the solution pH must then be dropped to about 8 and maintained at that level while resuming chlorination. The complete process may require two hours or more and can consume eight or more parts chlorine per part of free cyanide. Disadvantages of alkaline chlorination are the potential for the generation of cyanogen chloride gas and the related possibility of the incomplete oxidation of cyanide. The chlorine content of the treated solution is also increased, which can be harmful to aquatic species if discharged. Chlorine can be neutralized by treating with thiosulfate or hydrogen peroxide.

Hypochlorite reacts preferentially with thiocyanate (CNS^-) present in solutions over free cyanide. In solutions having significant thiocyanate concentrations, unless sufficient hypochlorite is used, free cyanide concentrations can remain little changed (Mathre and DeVries 1981). In the leaching of sulfide ores the formation of thiocyanate is common. Thiocyanate interference, under conditions where thiocyanates are readily formed, may require from two to four times the anticipated amount of chlorine to destroy free cyanide. Oxidation by hydrogen (H_2O_2) peroxide is also employed as a treatment for the selective destruction of free cyanide and the weak-acid-dissociable cyanide complexes. This method has the advantage of producing no undesirable by-products.

The reaction of hydrogen peroxide with sodium cyanide was first recognized early in this century. The rate of this reaction is relatively slow even in the presence of excess hydrogen peroxide. Masson (1907) showed that the reduction of cyanide concentration in solution from 50 ppm to less than 0.5 ppm requires more than eight hours even when the initial molar ratio of hydrogen peroxide to cyanide is as great as 5:1. In the late 1960's it was discovered that this reaction can be significantly speeded up by the addition of soluble copper salts. Since copper is often an accessory mineral to ores containing gold and silver, soluble copper salts may be naturally present in sufficient amounts to help accelerate the oxidation of cyanide. Most of the copper eventually precipitates out of solution during the reactions.

Ordinary hydrogen peroxide does not have a long shelf life. Stabilized hydrogen peroxide mixtures, such as Du Pont's KASTONE R, are specially formulated for treating cyanide wastes. Under certain conditions the addition of formaldehyde is also effective in increasing the rate of cyanide oxidation. Refer to the Du Pont publication included in this handbook for additional discussion of both alkaline chlorination and peroxide treatment.

The availability of sufficient quantities of hydrogen peroxide to treat large volumes of solution in an emergency situation, such as a case where ponds are about to overtop, must be taken into consideration, particularly in remote areas. Hydrogen peroxide treatment may be the preferred method of treatment in circumstances where sufficient treatment time is available and where water quality concerns would necessitate minimizing chlorine levels in discharged effluents.

Another treatment method, if time permits, involves ferrous sulfate, also known as copperas. Cyanide is converted to ferrocyanide, and to some degree to ferricyanide, also called Prussian blue. The latter compound is quite insoluble. These compounds are relatively stable and less toxic than free cyanide.

Ferrous sulfate is effective with high concentrations of cyanide in solution, but its effectiveness diminishes when treating very low cyanide concentrations. The relative reaction rates are slower than those involving alkaline chlorination. The optimum solution pH for reaction is reported to be near 8.5 (Schiller 1983, using potassium cyanide solutions). But in order for a substantial amount of the product to be converted to Prussian blue, a stable precipitate, Schiller (1983) reports results from experimental data that the solution must be kept below about pH 5. Reed et al. (1971) concluded that this method for cyanide removal requires close control of solution pH, and is effective on pure cyanide solutions. In near-emergency situations this treatment method may not be practical except when there would be at least a day or more of available treatment time. Moreover, without further treatment by alkaline chlorination or with peroxide, residual cyanide concentrations may still exceed discharge limits.

System Design and Construction Guidelines

Impoundments

Solution and waste impoundments must be adequately designed and constructed to meet basic applicable safety standards. In addition to design safety criteria, additional measures such as monitoring systems to detect leaks, secondary catchment ponds or sumps with pumpback systems can be variously appropriate depending on specific site conditions and a project's overall environmental setting.

In operation, heaps must be saturated before equilibrium is reached between inflows and drainage outflows. Considerable volumes of solution may be necessary to reach saturation. Upon shutdown, piles usually continue to drain for some time, from several days to several weeks depending on the size of the pile and its permeability characteristics. In coarse rubble heaps, this drainage may amount to one percent by weight of the heap. A 500,000-ton heap could produce about 1.2 million gallons of additional drainage over a period of time if operations were to be abruptly ceased.

Precipitation falling on a heap directly adds to the volume of process solution. Even for heaps of only a few acres in size, potential runoff volumes may be large. In the event of intense rain storms, peak discharges from heaps may not actually occur until some time after the storms have passed. Design volumes of ponds should be able to accomodate predicted runoff volumes. State and local governments may have ordinances specifying design or performance criteria appropriate to their specific locales. Process systems should be designed so that solution spills occurring within a process area and facility would drain to a collection area where spillage could be treated, if necessary, and where possible returned to the system.

Lately, much attention has been given in the Rocky Mountain region to the role of snow accumulation in the design of these operations. It has been found that drifting snow can impair the efficiency of runoff diversions and snowmelt may fill and overtop ponds.

Tailing impoundments may cover only a few acres or many acres. Consideration should be given to the entire area as a closed catchment capable of capturing a considerable volume of precipitation. Some operators have also found that the residual drainage from these piles may have sufficient metals values to warrant their collection and pumping back to the processing system. Adequate containment berms should be incorporated into the construction of a tailing impoundment to accommodate residual drainage from the pile and the runoff produced from a precipitation event. Design criteria are usually established by local authorities or state regulatory agencies. Runoff diversions located upslope from the impoundment can significantly reduce upland contributions of runoff to the area. Tailing impoundments have also been divided into individual cells in order to reduce the contributing area and better control precipitation intercepted by the pile. The need for large containment berms is thereby reduced.

Despite the fact that many cyanide leaching operations may be operated for only a few years, it is recommended that on-site runoff diversions be designed to convey the predicted runoff from a 100-year, 1-hour storm. All diversions should be properly maintained so that their purpose is served when needed.

In the design of solution ponds, consideration must be given to regional storm patterns. In areas of infrequent precipitation, it is recommended that total interconnected storage capacity of all ponds be adequate to contain the predicted runoff from a 100-year, 24-hour storm plus residual drainage from the heap. Other regions may have a distinct rainy season in which the net gain from precipitation exceeds the net loss from evaporation. In such areas, it would be appropriate to evaluate the water balance and design storage capacity for the predicted 100-year, 30-day period plus drainage from the pile. In some areas such as in the Pacific northwest or southern Alaska, it may not be practical to design impoundments to prohibit discharge. In such areas, facilities must be designed to meet NPDES regulatory requirements for effluent discharge.

Liners

Liners can provide an effective barrier to prevent off-site pollution where there is potential for cyanide, trace metals or other hazardous substances to migrate to soils or ground water outside the bounds of on-site containment. The use of liners for leach pads, ponds, and tailing or other waste impoundments attendant to cyanide leaching operations should be determined in consideration of the environmental characteristics of project sites, the chemical and physical characteristics of impounded materials, and the overall design and construction of facilities. Where geologic and hydrologic information indicates there is no potential hazard to ground water, surface water, or other environmental resources due to seepage of hazardous substances, or if natural site conditions, such as naturally impermeable soils or underlying impermeable bedrock, prevent seepage from impoundments, there should be no reasons to compel the use of liners for waste isolation at a cyanide leaching operation. Most sites, in fact, do not have such ideal characteristics, and most cyanide leaching operations, therefore, should require liners to ensure adequate environmental protection.

Liners may be of three general types: compacted clayey soil or clay, asphalt, or synthetic membrane. From an operational standpoint, the two most important considerations in determining the best type of liner for a particular application are compatibility of liner material with the type of waste to be contained, and cost. Permeability of some soils, for instance, may increase significantly if they come into contact with strong acid wastes. In addition, some synthetic membranes may be degraded by strong acids or bases, hydrocarbons, organic solvents, and ultraviolet radiation.

EPA standards for soil or clay liners or natural in-place soil barriers require that liner materials meet detailed specifications for texture, plasticity, pH, permeability, and compatibility with impounded wastes (Fung 1980). Similarly, EPA standards for synthetic liners require that liner materials shall be of sufficient strength to insure mechanical integrity, be compatible with the waste to be placed in the impoundment, and have an expected service life at least 25% longer than the expected time of facility usage. In addition, synthetic liners must satisfactorily resist attack from ozone, ultraviolet rays, soil bacteria, and fungus, have ample weather resistance to withstand the stress of freezing and thawing, and have adequate tensile strength to elongate sufficiently and withstand the stress of installation and/or the use of machinery or equipment. Finally, synthetic liner materials must resist laceration, abrasion and puncture, be of uniform thickness, free of thin spots, cracks, tears, blisters, and foreign particles, and be easily repaired.

Liners should be installed on a stable base. At facilities subject to EPA regulation, it is required that to prevent their rupture, all synthetic liners in a surface impoundment where mechanical equipment is used for operation (e.g., sludge dredging and collecting) shall have a protective cover of selected clean earth material, not less than 45 cm (18 inches) thick, placed directly on top of the liner.

The principal advantages of synthetic membrane liners include their virtually absolute impermeability when properly installed, and their high resistance to chemical and microbial degradation under many conditions. Disadvantages include cost, possible lack of long term integrity, and susceptibility to mechanical damage such as punctures and tears, and in some instances to deterioration by ozone and ultraviolet light.

Bentonite is a naturally swelling clay material which is used to seal ponds and impoundments. Sites in many western states may have naturally occurring bentonitic soils. Bentonite sealants are also commercially available. For many types of wastes, bentonite liners can provide an effective, economical seepage barrier. Problems with bentonite can occur when impounding liquid wastes are high in dissolved salts. Some commercial bentonite preparations are specially formulated to be effective in the presence of high salt concentrations.

Clayey soils or subsoils may also be suitable liner materials. Adequate soil compaction is the key to maximizing the effectiveness of native soils and clays as seepage barriers. (The section on "Engineering Properties of Soils for Foundations and Fills" in this handbook contains more detailed discussion of soil compaction and permeability.) Where the use of such materials is proposed, it is essential to establish the long term permeability characteristics of such materials considering the types of waste materials to be impounded. Potential problems due to freeze-thaw conditions should also be considered in the design of soil-lined impoundments. Soil compaction should be measured during construction to ensure liners will perform to standards as constructed.

A comprehensive discussion of the subject of liners is given in Fung (1980). Recommendations regarding specifications for flexible membrane liners can be obtained from the National Sanitation Foundation (Standard No. 54).

Back-up Systems

Much has been learned about the behavior and performance of heap leach systems over the past few years, particularly the causes for a number of reported spills and leaks. Consequently, some of the possible problem areas have now been identified and regulatory requirements have generally increased accordingly. The response has generally been to require additional safeguards including the installation of various types of back-up systems. Several types of systems are identified below in Table 9. It should be noted that these measures are neither universally required or practiced. The types of controls required are often influenced by such issues as the proximity of an operation to populated areas, relationship to surface and ground-water systems, political, regulatory or other institutional influences, and adjacent land uses.

Table 9. Back-up systems and system rationales.

System	Rationale
Auxiliary power capacity	Rural power systems or on-site generating capacity may fail. Often a system's solution balance may depend on continuous pumping to maintain proper pond levels.
Emergency ponds	Several situations are known where the process ponds have overflowed. Ponds filled as a result of storms or inadequate operating freeboard capacity could overflow as a result of additional solution volume.
Diversion ditches	Divert overland runoff away from the operations area and ponds.
Leak detection systems	Leak detection systems can provide early warning of inadequate containment, thus allowing prompt remedial measures to be taken before a leak or spill should become serious. The leak detection systems in use include both down-gradient monitoring wells and direct system monitoring.
Spill containment plan	A plan can provide increased ability to reduce the overall impact of a spill. Outlines a procedure for the treatment, handling and notification of authorities in the event of a spill.

Engineering Properties of Soils for Foundations and Fills

Proper evaluation of foundation and fill materials is essential to ensure stability and longevity of roads, embankments, foundations under buildings, and other structures appurtenant to a cyanide leaching facility. Depending on the nature and size of the project and environmental sensitivity of an area, detailed geotechnical and hydrologic investigations may be required to determine the suitability of soil materials and to identify potential structural design problems. The surface on which these structures rest must not be subject to excessive consolidation under load which could lead to damage of the structure. In an unlined tailing pond, the permeability of the foundation should also be known. For dam embankments and other critical fill slopes, materials must be able to withstand the shear stress imparted to the medium. In preparation for building a structure, unsuitable materials should be removed from the foundation area prior to further construction activities.

Engineers working on well capitalized projects will typically expend considerable effort in testing and selection of fill and foundation materials. Smaller operations, however, may not have the technical expertise to address these issues. Impoundments constructed on weak substrata or from unsuitable fill have resulted in many failures. The information provided here is intended to provide some guidance in assessing whether the selection of materials or construction techniques outlined in a proposed project plan or permit application deserve further attention. It is recommended that critical structures be designed and certified by a qualified professional engineer.

The following is a list of soil properties which are generally important in evaluating materials for foundations and fills.

Organic Matter. Organic matter, including roots and decaying litter, when incorporated into the medium, reduces soil strength and inhibits proper compaction.

Particle Size Distribution. Much of the strength in compacted soils is achieved through a reduction in internal pore spaces and subsequent interlocking of particles. Soils with a wide range of particle sizes tend to compact more easily because the smaller particles tend to fill the voids between the larger ones. A limit to this principal exists when large rocks are present in the medium.

Saturation. A high water content or environmental setting which may subject soils to saturated conditions can create site development problems. The shear strength of most soils decreases substantially when saturated. Also, soils with high moisture contents generally will not compact satisfactorily.

Clay Mineralogy. Clays will generally compact well initially, but later may consolidate further as moisture is lost through natural processes. Many clays will swell as water is reabsorbed. Certain clays may also exhibit unfavorable plasticity characteristics.

For almost all soils, maximum soil strength is achieved when the maximum density has been reached. Soil moisture aids in the lubrication between soil particles to facilitate compaction. The principle known as the Proctor Theorem states that there is one optimum moisture content at which a soil can be compacted to its maximum density. Moisture contents above or below this optimum level will not allow the soil to be compacted to its maximum density. Clays, for example, tend to have a high soil moisture optimum, with moisture requirements as high as 12 to 16 percent by weight. The specific moisture requirements for a particular soil are usually determined through laboratory testing known as the Proctor test. Standard procedures and a modified version are specified by the American Society for Testing and Materials (ASTM 1978). Specifications for a particular fill structure or other mass commonly require that a soil be compacted to at least 90 percent of maximum density.

The best method for uniform soil compaction is usually to grade and compact in lifts. Depending on the material involved and the engineering specifications, lifts may be as little as a few inches thick for critical clay membranes, to several feet for other materials and structures. The type of soils present may require different types of compaction. Special equipment is made for compacting soils. Four basic methods of compaction are static weight, kneading, impact, and vibration. In practice, most soils can be adequately compacted by use of equipment with steel tamping feet mounted on a large steel drum or by the use of heavy equipment with pneumatic tires traversing the lift. Tracked equipment will generally not provide satisfactory compaction because the large surface area of the track. If necessary, moisture control is provided by watering the soil to approximate near optimum moisture conditions prior to compaction.

For most natural fine-grained soils, permeability decreases as density (compaction) increases. Soil permeability is typically determined by laboratory testing. Results of permeability tests are usually reported in units of velocity (feet per year or cm per second) at a given percentage of soil compaction. For practical purposes, a soil is functionally impermeable if its permeability is less than about 10^{-6} cm/sec. In some applications for hazardous waste disposal projects (not involving cyanide), even lower liner permeabilities have been specified.

Clay liners are effective only when properly laid and compacted. A layer of clay only a few inches thick may theoretically be adequate, in many instances, but in practice it is difficult to achieve a consistent thickness for such thin layers. If clay is proposed as an underliner for a project, it is recommended that a minimum of six to twelve inches of material be used. Depending on the size and sensitivity of the project, it may be advisable to have the thickness and degree of compaction certified in the field by a qualified professional engineer or soil scientist.

Slope Stability and Erosion Control

The failure of earth masses may have impacts ranging from no appreciable consequence to loss of life. With regard to cyanide leaching operations, the magnitude of failure does not have to be great to affect substantially the overall safety of an operation. Shearing within a clay liner, failure of a solution pond, or failure of a tailing impoundment causing it to spill its contents into an adjacent drainage could have the consequences of environmental damage and regulatory action including revocation of an operating permit and fines.

The failure of slopes may occur as a result of static or dynamic loading, or from erosion. Among the various causes for a slope to fail include inadequate foundations, water saturation, excessive angle of slope, and mass loading. Dynamic loading refers to the forces exerted on the mass through natural seismic disturbances or man caused vibration.

The stability of an earth mass is usually defined in terms of a factor of safety. Reduced to the simplest of terms, the factor of safety is:

$$\text{FOS} = \frac{\text{forces resisting failure}}{\text{forces tending to implement failure}}$$

The higher the factor of safety, greater is the stability of the mass. Regulatory requirements for cyanide are inconsistent in the United States. For other types of projects, for instance embankment structures at coal mines, regulatory authorities require minimum static safety factors of 1.5 or greater.

Erosion is an important agent to be considered in the design of impoundment embankments. The overtopping of impoundments and subsequent erosion on outslopes is a common cause of failure in loose materials. Techniques to help reduce the susceptibility of the soil to erosion include proper design and construction, revegetation, rock riprap blankets, construction of contour furrows, terraces, pitting, reduction in slope gradient, and spillways.

Large impoundments and other critical load-bearing fill slopes should be designed by a competent professional, and if the possible failure of that structure could cause great environmental damage or threaten nearby inhabitants, the structure should be designed, and the final structure certified, by a qualified registered professional engineer.

For small impoundments, a certain amount of discretion may often go into judging whether a proposed structure will require additional design and construction considerations. In any event, some basic design and construction criteria should be inherent to a plan of operation. For small solution impoundments, such as a pregnant or barren solution ponds, the following general criteria are recommended:

1) An adequate foundation be prepared.
2) Suitable fill be used to construct the berms. The fill should be placed down with a maximum of one foot lifts, moisture added if necessary and compacted with a sheepsfoot, tamping foot or heavy equipment with pneumatic tires until visual consolidation ceases.
3) A minimum crest width of 8 to 10 feet maintained atop the berm.
4) Outslopes constructed to no steeper than 2:1 (h:v) and in-slopes no steeper than 1.5:1.
5) Adequate freeboard capacity is allotted in the structure.
6) A lined overflow spillway be sized and constructed to convey the runoff from the 100-year storm (or the event specified by area regulations) if the pond has the capacity to intercept runoff from other areas such as the leaching pad, process area, etc.
7) Outslopes be stabilized by replacing topsoil and planting with a grass cover, or by other suitable means.

Site Access

Access to areas containing exposed process solutions should be fenced and signs posted warning of the nature of chemicals present. Generally speaking, the standard four-strand barbed-wire type of fencing will not adequately secure critical areas against intruders. Of course, the argument could be made that no type of fencing will secure the area from determined visitors, but a reasonable attempt should be made. The issue may also have some legal implications as well if an accident were to occur. For areas containing open solutions, it is suggested that a six-foot tall chain link fence topped with barbed wire strands surround the critical sites.

Standard 10-inch by 14-inch placards stating "DANGER CYANIDE" or "DANGER TOXIC CHEMICALS" are commercially available. Signs may also be used depicting a "skull and crossbones" symbol. This type of sign is also commercially available. It is recommended that signs be clearly posted on fences at a minimum of 100-foot intervals. All entrances should also be posted.

Handling and Disposal of Containers

Sodium cyanide comes in several kinds of containers. Non-returnable 100-pound and 200-pound (net) steel drums are suitable for small operations. Larger operations can order sodium cyanide in returnable 3,000 pound (net) steel flow bins. Reagents should be adequately stored in a secured location away from acids and oxidizing materials, and protected from moisture. Covers should be kept in place when containers are not in use, and spills should be cleaned up immediately. Appropriate safety precautions including protective clothing and equipment should be worn by workers handling cyanide and caustic.

Because sodium cyanide absorbs moisture from the air, cyanide residue may sometimes remain caked on the inside of spent reagent drums. The EPA does allow the re-use of cyanide drums if their specified "triple rinsing" or equivalently effective cleaning procedure is used in accordance with 40 CFR 261.7(b) (3). The flow bin containers manufactured by Du Pont are returnable with required treatment.

The accumulation of spent steel drums has become a management problem for a few operations and it is important that the operator address this matter in the plan of operations. Unrinsed or improperly rinsed drums containing residual cyanide would fall under the EPA's regulation of acutely hazardous material. Even if drums are not re-used, proper rinsing prior to disposal is essential. With proper rinsing, drums are considered non-hazardous and may be disposed of accordingly. It is recommended that a container disposal plan and a proposed disposal site (such as local sanitary landfill) be discussed with appropriate government officials prior to implementation of operations. Such discussion can be critically important especially if a large number of drums is involved. On-site disposal of spent barrels may be a possibility if allowable under local and state regulations.

Site Monitoring

Monitoring of environmental conditions at cyanide leaching projects is essential for modern, well run operations. Projects in states with established environmental regulations and permitting programs for cyanide leaching operations are generally subject to defined requirements for pre-operational environmental baseline information as well as ongoing environmental monitoring programs. The same may be true for some projects on federal lands subject to NEPA requirements as administered by various surface management agencies. Monitoring requirements of some states and agencies are more stringent than others. Unfortunately, the extent of required monitoring may not always be related to the actual potential of an operation to affect a sensitive environment. Monitoring of both surface and ground-water systems is important. Other environmental aspects such as air quality or wildlife may be more or less important depending on the location of a specific project.

An environmental monitoring program under routine operating conditions should be required as an extensive data gathering exercise. Rather, such programs should be developed from a standpoint of practicality to provide information, at a minimum, to ensure that the basic safety and environmental protection measures at an operation are functioning properly. Plans for and the capability to mobilize additional monitoring measures in the event of an accident should also be developed. It must be appreciated that monitoring in itself is not a function which would serve to control a failure, but it can provide early warning that a problem exists. Information presented in this chapter will provide a general framework for developing monitoring and data gathering programs for cyanide leaching operations. Types, locations, frequency and intensity of sampling efforts for specific monitoring programs must be governed by the nature and settings of each particular operation.

Recommended Analyses and Methods

Surface and ground-water monitoring will be the most important monitoring for most projects. Parameters to be analyzed may be stipulated by regulatory agencies in some states, and local or state agencies may be consulted for the specific requirements. Sampling locations for ground water may include existing nearby wells, springs and artesian sources. All potentially affected aquifers should be monitored. Where wells do not exist, or if necessary well completion data are not available, it may be necessary to drill new wells. Monitoring wells should be down-gradient from the cyanide leaching operation. Wells up-gradient may be sampled to establish baseline or background conditions. This presumes that sufficient information is available about the hydrologic system to establish directions of ground-water flow. Where cyanide leaching operations occur near perennial streams, receiving drainages should be routinely sampled above and below project sites. Ephemeral and intermittent drainages should be sampled during periods of flow. Receiving waters must also be monitored in the event of a spill. In conducting a monitoring program, it is always essential that sampling and analytical methods be documented.

Frequency of sampling should be governed by the type of project and the environmental setting. At water sampling locations certain field measurements are typically made. These may include measurements of temperature, pH, electrical conductivity, water level in wells (prior to bailing), bailed volume (well sampling), and flow at stream sampling locations. Laboratory analyses may be conducted for total dissolved solids (TDS), various forms of cyanide, and various metals. For the purposes of environmental monitoring, it is important for operators and regulatory officials to come to an understanding as to what form of cyanide is to be analyzed. It is recommended that both free and weak-acid-dissociable cyanide concentrations be determined in the water samples. Weak-acid-dissociable cyanide is an important analysis because it includes both free cyanide and weakly bound cyanide complexes which can react to form free cyanide under slightly acidic conditions, such as may occur in the drainages of many metal mining districts. Analysis for total cyanide in the receiving waters or effluents may also be important in some circumstances. Where total cyanide concentrations are higher than free cyanide or cyanide amenable to chlorination, the potential for cyanide dissociation from other complexes and photolysis may be significant.

In historic mining districts many streams may be acidic and have elevated concentrations of metals, dissolved solids and sulfate. Even cyanide leaching projects proposed to be located in such watersheds, background monitoring can be important to document existing conditions with respect to water quality. Any anomalies which may later appear in monitoring data may be reason to increase the number of sampling stations, frequency of sampling and parameters tested.

Water sampling should be done according to accepted methods. The EPA has extensively described its approved techniques, although techniques other than EPA techniques can be appropriate in many instances. Most cyanide leaching operations do not have complete analytical facilities on site, and therefore collected samples are sent to outside commercial laboratories. Analytical results will not be valid unless procedures for sample collection and preservation are observed. These procedures may involve filtration and/or acidification of samples in the field, and preserving samples on ice. A good laboratory will be able to provide necessary advice and direction in this regard. Many laboratories, in fact, will provide pre-acidified sample containers and ice chests suitable for shipment. Forms should be developed to provide appropriate sample chain of custody documentation. Usually, at least two bottles are used for sample collection at each sampling location. One bottle containing a small volume of nitric acid is used to keep metals in solution; the other contains sodium hydroxide to keep the cyanides stabilized. Since the former will result in an acidified sample, a word of caution is offered to workers sampling solutions which may contain high concentrations of cyanide: such samples have the potential to produce toxic HCN fumes. Because of the relatively low stability of cyanide solutions, it is recommended that the analysis for cyanides be completed as soon as possible following sampling.

Most operations should have the ability to analyze for free cyanide on site as a necessary part of process control. A simple titration method for analyzing free cyanide in solution is often used, and although this method is not suitable for free cyanide concentrations below about 1 ppm, it can be useful in the event of a spill to help assess quickly the severity of the situation. For very low levels of detection, more sophisticated laboratory equipment and testing skills are needed.

Current analytical methods for very low levels of cyanide are plagued by rather poor accuracy. For total cyanides and weak-acid dissociable-cyanides, the American Society for Testing and Materials (ASTM) method D 2036 (1982) is recommended. The respective analytical procedures each incorporate three possible methods of measuring cyanide: titrimetric, colorimetric, and selective ion electrode measurement. The lower limits of detection in mg/liter, using these methods is claimed in the ASTM method to be 1.0, 0.03 and 0.03, respectively. A method which would improve the analysis of free cyanide is now under development by the ASTM.

Surface Water Sampling

In environments where perennial streams are present or where intermittent streams may flow a considerable portion of the year, a minimum of two monitoring stations should be located upstream and downstream of the project. If the project is large or if several tributary systems compose the local drainage net, it may be necessary to establish additional monitoring locations. Initially, at least, quarterly sampling may be conducted to characterize seasonal water quality fluctuations. In general, greater concentrations of most constituents occur during low flow periods. Occasionally, regulatory agencies have imposed more stringent discharge limitations applicable during periods of low flow.

Ground-water Sampling

In order to be most effective, monitoring wells below (with respect to the hydrologic gradient) process areas, solution ponds or tailing impoundments should be established as close to operational areas as possible, and should be established where geologic and hydrologic conditions would permit the interception of subsurface waters. A ground-water monitoring program should also include at least one well located upgradient of the operation for comparative purposes. Many historic mining districts located in mountainous areas have been deep-drained by tunnels driven at lower elevations. Vertical or near vertical ground fracture systems or particularly granular or rubbly ground in such areas may limit the ability of monitoring wells to characterize ground-water quality except on a very localized basis by prohibiting the lateral migration of ground water. Alternatively, direct monitoring and other monitoring systems may be incorporated into the design of the structure and solution ponds as noted in the following sections. Springs may be found near operations which may serve as useful ground-water monitoring stations.

Although relatively simple in concept, it is no less essential that monitoring wells be drilled and completed properly. Many drilling muds and lubricants, for instance, are high in trace metal concentrations, and should not be used in drilling wells where monitoring trace metal concentrations in ground water will be necessary. Lack of adequate completion data will also severely limit the usefulness of a monitoring well.

In more complex hydrologic settings, it may be necessary to isolate saturated strata to be sampled by selectively backfilling the drill hole with clays above and/or below the sections where sampling is desired. It is recommended that monitoring wells be pumped or bailed (three to five casing volumes) prior to sampling.

Direct Process Sampling

In areas where cyanide operations are regulated, many of the required system control techniques appear to have been adapted from the control and monitoring of radioactive and other hazardous wastes. Direct process monitoring is one of the techniques which has been modified and applied to cyanide leaching operations, primarily to open heaps or tailing areas in hydrologically sensitive environments. Many variations in design have been used for direct monitoring but the principle remains the same: systems are designed and constructed to enable the detection and sampling of leaking solutions immediately beneath a liner.

One type of system used beneath some heaps and solution ponds incorporates the French-drain principal. A grid of perforated piping is contained within an aggregate filter under the liner. The grid may be sandwiched between two liners as illustrated previously in Figure 2. The piping may outlet directly down gradient from a heap. This permits visual inspection for possible leaks. Sampling can be conducted frequently where direct monitoring is used. In areas where personnel routinely work, a direct monitoring system may permit daily observation. Obviously, if solution appears in any of the locations where a direct monitoring system is used, there is cause for concern and immediate attention should be given to the matter.

In instances where direct monitoring systems may not be applicable or appropriate, ground-water monitoring wells, lysimeters, monitoring of surface waters, and seepage collection ponds located near the toes of impoundments are alternative monitoring methods which may be employed in monitoring programs.

Other Monitoring Systems

Monitoring systems beneath liners which incorporate variations of the French drain principal are capable of detecting leaks but do not indicate where leaks may have occurred. A disadvantage of monitoring wells is that they may not detect a problem for a considerable period of time. Of course, each of these systems has its own distinct advantages. There are other monitoring systems which deserve some consideration.

An experimental system described by Johnson (1983) utilizes a grid network of coated and uncoated wires placed beneath a liner and takes advantage of the corrosive properties of the solution by measuring changes in the electrical properties imparted to the wires. A data logger is used to supply the current and monitor the system. The use of such a system is claimed to be able to precisely locate a leak. It would seem difficult for this type of system to assess the magnitude of the leak, and the character of escaping solution would remain unknown. The use of such a system would best be considered in conjunction with another type of system which has the capability of sampling solutions.

Lysimeters have been used successfully in cyanide leaching applications. A lysimeter is a porous ceramic cup capable of collecting moisture from unsaturated soil. The cup is sealed and is connected by two tubes, one used as a vacuum and pressure line, the other as a discharge line. The ceramic cup extracts moisture from the surrounding soil when subjected to a vacuum. The system is periodically reversed and then placed under pressure. Accumulated solution is then forced through an outlet line to the surface for sampling. Special techniques are generally used for the completion of the holes in which lysimeters are placed. Lysimeters do not have the ability to locate a leak in the liner, but if placed in sufficient number could help evaluate the size of a contamination plume. They would also have limited use in environments with a shallow saturated zone which could interfere with their performance and purpose. Lysimeters may be ineffective in ground with densely fractured rock. Similarly, very coarse materials may not permit adequate sample collection. Lysimeters seem best suited for placement in fine sands, alluvial materials, glacial drift, and deep soils. Other limitations include the potential for the ceramic cup to plug, and the reliability of the internal check valves (Johnson 1983). Additional discussion of ground-water monitoring techniques, including and evaluation of lysimeters, can be found in Everett et al. (1984 and 1985).

The best monitoring program cannot prevent leaks or spills, just as monitoring cannot clean up leaks or spills once they have occurred. But effective monitoring can be invaluable by minimizing the impacts of unforeseen events by providing accurate and early detection of problems. All operations, no matter how small, should have established contingency plans for quick response in the event of an emergency. In practice, most spills or other breaches of containment will not precipitate an acute emergency situation. But until a situation can be thoroughly assessed, contingency measures should be enforced. Even in a non-emergency situation, a chronic, slow leak in an impoundment, for instance, can create a considerable potential hazard if undetected.

Compact, portable equipment and instruments suitable for use in the field are available from scientific supply companies and dozens of manufacturers or their dealers. The best field equipment is rugged and simple to operate. Table 10 gives the types of instruments commonly used for field measurements (primarily water sampling) and recommended sensitivities and ranges. In addition to the equipment listed in this table, various portable water quality test kits are also available for the on-site testing of certain metals and cyanide.

Table 10. **Reconnaissance level test equipment for use at cyanide leaching operations.**

Parameter	Suggested range and sensitivity	Equipment
pH	1-14 pH, ± 0.1	pH meter
Electrical conductivity	0-10,000 µmhos ± 1%	EC meter
Hydrogen cyanide vapor	0-25 ppm	Inorganic vapor dosimeter
Temperature	25-120°F ± 0.5°	Thermometer

For further information on sources of equipment, *Pollution Equipment News*, published bimonthly, and the *Pollution Equipment News 1986 Catalog and Buyers Guide*, updated annually, are excellent references. Information about these publications is available from—

Pollution Equipment News
Rimbach Publishing
8650 Babcock Blvd.
Pittsburgh, PA 15237
(412) 364-5366

Vapor dosimeter tubes for measuring HCN gas concentrations in air are available from—

MSA
600 Penn Center Blvd.
Pittsburgh, PA 15235
(412) 273-5000

4

Decommissioning and Reclamation

Decommissioning

After a cyanide leaching operation has exhausted its economic supply of ore, facilities must be properly decommissioned to prevent long term health, safety or environmental problems, and to help ensure adequate and successful reclamation. Decommissioning involves the dismantling and removal or disposal of buildings and other structures, and the stabilization of permanent facilities such as tailing impoundments. Because of the wide range in environmental settings and regulatory regimes in which cyanide leaching operations occur, decommissioning methods may vary. This section presents a broad framework of measures which may be appropriate in decommissioning cyanide leaching sites.

In dismantling structures, salvaged materials can be sold for scrap. Any equipment which may contain cyanide or other hazardous residues must be thoroughly cleaned prior to removal from a project site. Other materials may be permanently disposed of on site in accordance with applicable ordinances and regulations pertaining to solid waste disposal. Often it is most economical to dispose of non-salvageable wastes in tailing impoundments. In such cases, care must be taken to ensure that disposed materials do not threaten the integrity of liners, although long term liner integrity is not a concern in some decommissioned facilities. Scrap such as pipe and structural steel can puncture liners if improperly placed in impoundments. Tanks, bins, and culverts should be cut into sections in order to prevent voids in reclaimed impoundments. Such voids can result in future subsidence problems and compromise the long term integrity of impoundments. This long term stability and integrity of reclaimed heaps and tailing impoundments is of primary concern.

An evaluation of existing embankment slopes should be made to determine if slope reduction is necessary. Coarse tailing that is well drained may be stable with slopes as steep as 1.5:1 (h:v), although such slopes may be difficult to revegetate. With finer-grained materials and/or moisture climates, less steep slopes are often required to achieve stability. Overall, where possible, slopes steeper than 2.5:1 should be avoided.

Decommissioning of heaps and tailing ponds should include rinsing of heaps, neutralization of residual cyanides, if appropriate, and pond dewatering. Dewatering may be accomplished by evaporation, seepage, or water treatment and discharge. To be most effective, capping of tailing should be done on a tailing surface that is less than saturated. Caps are normally designed to be free draining (on the surface) and resistant to erosion. Caps are sometimes constructed in layers of clay and sand and gravel to reduce infiltration into the reclaimed tailing and to provide capillary breaks. Covers for reclaimed heaps may be less critical, but slope stability and resistance to erosion are no less important.

Waste effluents from tailing impoundments and heaps as point-source discharges are required to have NPDES permits. Effluent discharge from heaps can be managed in a number of ways. One technique which can be used under certain conditions involves ripping a berm and channel around the perimeter of a heap. This promotes infiltration of runoff from the heap. The distribution of outflow can, in some cases, be controlled by the construction of periodic weep outlets in the existing containment berms. A weep outlet is a very small spillway. If constructed of rock rubble, such structures may be relatively enduring. Developed at frequent intervals, these small outlets help disperse and manage runoff. Other structures such as peripheral rock filter berms may also be employed to manage runoff from some waste piles.

Certain projects with unusual environmental conditions can require more elaborate and specialized decommissioing practices. In particular, waste disposal facilities impounding hazardous or toxic substances such as trace metals or acid forming materials in proximity to high quality ground- or surface- water resources may require more stringent—and probably costly—decommissioning procedures to ensure long term protection of natural resources. Even at unregulated operations, under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as "Superfund"), the potential liability for the pollution of natural resources can be considerable. Such liability should be seriously considered by any prudent operator in developing plans for decommissioning and reclamation. Finally, post-operation monitoring of surface and ground water can provide important information regarding the long term character-istices of leachates, effluents, and runoff.

Aquifer Clean-up

Methods for aquifer clean-up are often organized according to whether the pollution problem is acute or chronic. Acute pollution results from accidental spills and are characterized by their emergency nature (Knox et al. 1984). Chronic aquifer pollution may occur from a number of point or area sources (Knox et al. 1984) and may be prolonged. The methods employed to clean up pollution problems are considered in terms of the needs to control the problem and range from goals of abatement to goals of restoration. For example, it may be desired only to isolate the plume of pollution from further movement into or through the aquifer, or prevent additional leaching at the source. On the other hand, it may be necessary to remove the contaminants and restore the aquifer to its normal quality. Table 11 is a general tabulation of the problems, goals and related methodologies for aquifer clean-up.

Literature addressing aquifer clean-up techniques involving cyanide in minerals processing is lacking. However, many of the techniques applied to other industrial process are derived from some basic principals of science and have a wide range of applicability. Lindorff and Cartwright (1977) summarized information on the remedial action techniques used in 32 cases of aquifer pollution produced by industrial wastes and leaching from minicipal landfills. Table 12 presents those cases cited by Lindorff and Cartwright which involved cyanide or metals, and the remedial action used.

Table 12. Aquifer clean-up survey of selected pollutants.

Pollutant or Source	Location	Remedial Action Used
Acrylonitrile, chemical wastes, cyanide	Illinois	Removal wells
Chromium, heavy metals	New Jersey	Removal wells
Aluminum and mine tailing	Oregon	Removal wells
Cadmium, lead, zinc	Idaho	Interception trench

Adapted from Lindorff and Cartwright (1977)

Methods for the clean-up of aquifers include the use of removal wells and interception trenches, grouting, slurry walls, surface water control and liners, and in-situ chemical treatment. Table 13 lists these methods and their uses. Much of this information has been summarized from information presented by the EPA (1985) and Knox et al. (1984). Each of these techniques can be used alone or in combination with the other techniques.

Reclamation

Broadly defined, reclamation is *the restoration of a disturbed site to some beneficial use.* It is not as esoteric a pursuit as it no doubt seemed to the mining industry in the early 1970's. Reclamation knowhow has advanced tremendously since the advent of laws and regulations, particularly having to do with coal mining, during the late 1970's. The practice of

Table 11. Methodologies for aquifer clean-up.

Severity of problem	Goal	Methodologies
Acute	Abatement	1. In-situ chemical fixation. 2. Excavation of contaminated soil with subsequent backfilling with "clean" soil.
	Restoration	1. Removal wells, treatment of contaminated ground water, and recharge. 2. Removal wells, treatment of contaminated ground water, and discharge to surface drainage. 3. Removal wells and discharge to surface drainage.
Chronic	Abatement	1. In-situ chemical fixation. 2. Excavation of contaminated soil with subsequent backfilling with "clean" soil. 3. Interceptor trenches to collect polluted water as it moves laterally away from site. 4. Surface capping with impermeable material to inhibit infiltration of leachate-producing precipitation. 5. Subsurface barriers of impermeable materials to restrict hydraulic flow from sources. 6. Modify pumping patterns at existing wells. 7. Inject fresh water in a series of wells placed around source or contaminant plume to develop pressure ridge to restrict movement of pollutants.
	Restoration	1. Removal wells, treatment of contaminated ground water, and recharge. 2. Removal wells, treatment of contaminated ground water, and discharge to surface drainage. 3. Removal wells and discharge to surface drainage. 4. In-situ chemical treatment. 5. In-situ biological treatment.

(Adopted from Knox et al. 1984).

Table 13. Remedial methods of ground-water pollution control.

System	Application	Comments
Well systems	Control movement of subsurface waters through pumping and consequential manipulation of the hydrualic gradient. May also be used for injection. Readily installed.	Most widely used method to control groundwater pollution. Application in fine-grained soils is limited. Operating costs are high. Extracted water is often treated and then discharged to surface waters.
Interceptor trenches/drains	Collect groundwater. Function similar to a line of extraction wells. Installed perpendicular to groundwater flow and downgradient from site.	Effective in low permeability soils for collecting leachates.
Surface water control	Reduce surface water to site and leachate production. Ditches, berms, and surface grading are used.	Generally used in combination with all other methods.
Liners/surface capping	Usually placed over the site. Minimizes surface infiltration and flow of leachates to groundwater. May be made of synthetic or natural materials.	
Grouting	Reduces permeability of soils. Emulsion, liquid or slurry is injected through drill holes into soil. Material fills pore spaces and hardens with time.	Expensive. Generally practical for small areas. Method limited to certain types of soils.
Slurry wall	Provides impermeable barrier. Involves digging trench around site and filling with impermeable material such as bentonite clay.	Can be used upgradient and downgradient from site.
In-situ treatment	Uses injection wells to introduce treatment agent usually into an area at the head of the pollution plume. Agent must be specific to contaminant such as the use of alkalies or sulfides to immobilize heavy metals or oxidizing agents to destroy cyanides.	Useful only under particular conditions.

reclaiming disturbed sites is now accepted as a necessary aspect of the business of mining.

Reclamation Planning

Reclamation priorities vary from site to site. Human health and safety, however, must always precede all other concerns. This concern necessarily dictates safe disposal of hazardous or toxic substances which can be associated with cyanide leaching operations. Cyanide is not always the only substance of concern: toxic trace metals and hazardous organics may be of even greater concern than cyanide over the long term. Any substances considered hazardous under RCRA must be disposed of in accordance with RCRA requirements. In theory, various waste disposal methods may exist for a given project, but in practice, permanent on-site disposal for non-hazardous wastes is usually both environmentally acceptable and almost always the least cost alternative. Technology for the processing of certain hazardous materials into non-hazardous materials has also been developed. Except for the neutralization of cyanide, discussed previously, such technology is both expensive and generally not applicable to wastes associated with ore processing and cyanide leaching.

Reclamation planning should be a key process in the development of a project. It is essential that developers and operators view reclamation planning as an integral part of overall project planning and design. Since reclamation costs can significant, the evaluation of project alternatives in areas such as location of facilities, site access, processing, and waste disposal must include respective reclamation costs for each alternative.

At a minimum, a reclamation plan should also describe in qualitative terms what a reclaimed site will be like and how it will be suitable for the proposed future land use. A reclamation plan should describe how reclamation will be accomplished, including, for instance, the dismantling of buildings and other structures, decommissioning of heaps and tailing ponds, grading, topsoiling and revegetation, and erosion control. Where regulations require, reclamation plans must include such details as reclamation timetables, equipment schedules, estimates of earthwork volumes and materials quantities, and cost breakdowns. Such level of detail is necessary under some state regulatory programs to determine that posted reclamation bonds would be adequate to cover reclamation costs in the event of operator default.

Several western states, including Montana, Wyoming, Colorado and California have established comprehensive regulatory programs applicable to cyanide leaching operations. An appendix is included at the end of this chapter listing the primary permits and regulatory agencies for cyanide operations for a number of western states. As noted, California's program employs a different approach from most other states in that regulatory enforcement is delegated at the county level. California's regulatory program is well described in a recent publication by Deem and Hillman (1984), *California Exploration and Mine Permitting*. A comprehensive discussion of federal hazardous waste disposal regulations can be found in Mallow (1981). Issues relating to the regulation of the transportation of hazardous materials are presented in Abbott et al. (1984).

Revegetation

Reclamation nearly always involves *revegetation* to recreate more or less "natural" conditions. Establishment of vegetation cover on disturbed sites serves to reduce rates of soil erosion. Water and air quality are benefitted by attendant reductions in sediment runoff and fugitive dust emissions. Revegetation also provides cover for wildlife and forage for grazing species, and a revegetated landscape is generally self-maintaining and naturally self-regenerating. The most conspicuous benefit of revegetation is that it is inherently an aesthetic solution to the problem of reclamation.

Preparation of a suitable surface is essential to successful revegetation. Surface preparation entails two basic elements, 1) grading to produce an inherently stable surface, and 2) distribution of sufficient quantities (depths) of material suitable for a rooting zone for plants. In most instances salvaged native topsoil is the best source of plant growth medium, but there are projects for which the volume of available topsoil is too small to be adequate for reclamation. This is often the situation at older operations where no topsoil was salvaged prior to site development. In some areas the quality of topsoil may not justify its salvage for reclamation. Adequate soil survey information is necessary to assess topsoil quality and availability.

The importance of surface and slope stability in revegetation work cannot be overemphasized. While vegetation cover can be very effective in reducing soil erosion rates, especially due to sheet and wind erosion, it is no less true that the ability to establish any vegetation cover at all can be significantly compromised on unstable or erodible slopes. Susceptibility to erosion of a reclaimed surface is the result of a complex interaction of a number of factors. Some of these factors, notably soil texture, may not be controllable. Other factors can be influenced, most significant of which are length and steepness of slopes. For critical areas and harsh sites, the expense of additional site grading to reduce slope length and steepness is often justified, and can mean the difference between successful vegetation establishment or revegetation failure.

Vegetation cover is generally not as effective in controlling gully erosion. In reclaiming areas where susceptibility to rilling, piping or gullying is a problem, final configuration of surface drainage patterns should be given due attention. These problems tend to occur on certain types of soils, on larger reclaimed areas, in high precipitation or snowmelt areas, and especially on areas having steep slopes. Effective erosion control is critical for reclaimed embankments and tailing ponds where long term integrity of structures must be assured. A thorough discussion on slope stabilization and erosion control is given in Gray and Leiser (1982).

In addition to a stable surface, successful revegetation also depends on the availability of a suitable medium for revegetation. There exist numerous and varied regulatory approaches to this issue.

Decommissioned cyanide heaps and tailing impoundments may require from little or no soil cover to several feet of cover to be sucessfully reclaimed, depending on site conditions. Less than two feet of cover may be of tenuous effectiveness with respect to the long term isolation of waste materials, in cases where such long term isolation is an important concern. In cases where acid formation or toxic trace metals are of concern, increased cover thickness may be warranted. Many ore processing waste materials contain potentially hazardous concentrations of such trace metals as lead, arsenic, cadmium, silver, and others.

Reclamation research has not yet satisfactorily dealt with the problem of root penetration into tailing or other potentially hazardous media. It has been demonstrated that many plant species can accumulate potentially toxic (to animals or humans) concentrations of trace metals with no apparent harmful effects to the plants. The potential concern for physical or biological migration of hazardous substances through soil covers from waste materials to reclaimed surfaces and to the environment at large cannot be generalized, and must be evaluated on a case-by-case basis. In cases of significant concern, increased cover thickness and/or the use of impermeable barriers can be warranted.

Salvaged topsoil is commonly used as a final top layer for reclamation. Research has shown that in many cases as little as six inches of topsoil can significantly enhance revegetation results. The potential benefits of topsoil seem to be diminished to some extent for projects requiring that salvaged topsoil be stockpiled for many years. Research is still being done in this area. Topsoil in reclamation is discussed more thoroughly in Hargis and Redente (1984), Jurinak (1982), McKell (1982), DePuit and Schuman (1983), and U.S. Forest Service (1979).

Prior to reclamation seeding, a suitable seedbed must be prepared. Where slopes are not too steep, agricultural tillage equipment can be used to work the soil. In recent years, a great deal of specialized reclamation equipment has also been developed (U.S. Forest Service 1983). Seeding should be done during favorable seasons. In many parts of the western United States soil moisture can be limiting to plant growth during much of the growing season. Best times for seeding in most parts of the country are usually in early spring or late fall.

Selection of species for use in reclamation is always a site-specific exercise. Reclamation species should be those which are reliable to establish and which are commercially available. In addition, species selected for a particular site must be adapted to grow under climatic and edaphic conditions at the site as well as suited to the post-reclamation land use. Thornberg (1982) provides a comprehensive review of plant materials and a planting guideline for the western United States.

Seed may be broadcast or drilled into the soil. Hydroseeding is a method commonly employed for seeding steep slopes. A hydroseeder sprays seed in a high pressure water slurry. Amendments such as fertilizer and mulch can also be applied with a hydroseeder. Seeding rates should be carefully controlled regardless of seeding method. Too little seed can mean loss of a stand. Many native species are unreliable germinators and should be seeded at higher rates. In semiarid and arid environments, too much seed can create competition between seedlings and reduce seedling vigor. Seeding rates are normally expressed by contractors and specifications writers in pounds per acre, but seed mixtures and rates should be formulated on a seeds per square foot basis. Seeding rates should also take into consideration seeding methods: for broadcast seeding, rates are normally increased up to two times the seeding rate appropriate for drill seeding.

In conjunction with seeding, mulch and fertilizer are commonly used. Materials used for mulching include blown hay or straw, wood fiber, asphalt slurries, gravel, jute, and various synthetic materials. Rates and application methods are as varied as the materials themselves. Typical rates for blown hay or straw mulches are from 0.5 to 1.5 tons per acre. This type of mulch is most effective when crimped into the soil or covered with a tackifier spray to make the mulch cover more resistant to blowing away in the wind. Manufactured type mulches are normally best to apply in accordance with the manufacturers' recommendations. Fertilizers are available in solid and liquid form. Pre-packaged blends may be suitable for small projects, but for larger projects pre-blended bulk orders should be more economical. Fertilizing practices vary considerably between regions of the country. Wherever possible, application of fertilizer should be determined from soil test results as well as consideration of species to be planted. County agents, the Cooperative Extension Service, and the Soil Conservation Service in each state are generally reliable sources of assistance in the area of fertilizers.

In the western United States, soils tend to be alkaline. These soils may be low in plant-available phosphate and certain trace elements, particularly iron and zinc. Soils in more humid climates, such as in Alaska, as well as many forest soils tend to be more acidic. Some acid soils can be improved by application of lime. Most soils can be considered deficient in plant-available nitrogen with respect to some plant species, but many plant species, especially unimproved range species and natives commonly used in reclamation, will not show any response to added fertilizer nitrogen.

Application of too much fertilizer can damage plant stands, especially stands of young seedlings. Use of "slow release" fertilizers is one means of avoiding fertilizer burn. Slow release fertilizers are generally more expensive than other forms, but have the advantage of remaining fixed in the soil and benefitting growing plants over a much longer period of time. For best results, these and other fertilizers should be incorporated into the soil prior to seeding.

Live seedlings can also be planted. Such plantings tend to be labor-intensive and expensive, but have the advantage of allowing much more reliable and rapid establishment of many species, particularly trees and shrubs. Such plantings can be especially beneficial on steep slopes. It is important that nursery stock be obtained from reputable suppliers, and that it is disease free. Plants raised in greenhouses should be "hardened" out of doors for up to several weeks prior to planting. When planting live seedlings, it is essential that soil moisture be adequate. Supplemental watering can improve seedling survival. A useful guide to revegetation techniques is given by Cook et al. (1974).

Post-reclamation monitoring and management of revegetated areas depend to a large extent on the size of the project, the type of habitat, and the regulatory regime. Vegetation monitoring and sampling techniques are discussed in Chambers and Brown (1983) and Cook and Bonham (1977).

LITERATURE CITED

Abbott, L., G. Bulanowski, B. Foster and J. Jordan. 1984. Hazardous materials transportation. A legislator's guide. Nat'l Conf. of State Legislatures, Denver, CO.

Alesii, B.A. and W.H. Fuller. 1976. The mobility of three cyanide forms in soils. U.S. EPA, National Solid and Hazardous Waste Research Center. EPA-600/9-76-015.

American Cyanimid Co. 1959. Report on sodium cyanide: 30-day repeated feedings to dogs. *In* Smith, R. (ed.). 1980. Mammalian toxicology and human health effects. p. C-1—C-36. Ambient water quality criteria for cyanides. EPA 440/5-80-037, U.S. Environmental Protection Agency, Washington, DC.

American Society for Testing Materials (ASTM). 1978. Moisture-density relations of soils and soil-aggregate mixtures. ASTM designations D698-78, D1557-78, Philadelphia, PA.

Barsky, G., S.J. Swainson and N. Hedley. 1962. Dissolution of gold and silver in cyanide solutions. Trans. Amer. Inst. Min. Metal Eng. 122:660.

Broderius, S.J. 1978. Influence of external factors on the toxicity of iron and copper cyanide forms, Quarterly Report, Jan. 1- March 31, 1978, EPA Grant #R80529-01-D, Univ. of Minn., reference cited in Schmidt et al., 1981.

Chambers, J. C. and R. W. Brown. 1983. Methods for vegetation sampling and analysis on revegetated mined lands. General Tech. Rep. INT-151, U.S. Forest Service Intermountain Forest Range Exp. Sta., Ogden, UT.

Chisholm, E.O. 1975. Canadians operating gold leaching operations in New Mexico. The Northern Miner 61(27):59-60.

Cook, C. W. and C. D. Bonham. 1977. Techniques for vegetation measurements and analysis for a pre- and post-mining inventory. Colorado State University, Range Science Department, Science Series No. 28, Fort Collins.

Cook, C.W., R.M. Hyde and P.L. Sims. 1974. Revegetation guidelines for surface mined areas. Colorado State University, Range Science Dept., Science Series No. 16, Fort Collins.

deDuve, C. 1955. Tissue fractionalization studies: 6. Intracellular distribution patterns of enzymes in rat liver tissue. Biochem. Jour. 60:604.

Deem, D.E. and B.A. Hillman. 1984. California exploration and mine permitting (the eight mother lode counties). D.E. Deem, P. O. Box 1198, Murphys, CA.

DePuit, E.J. and G.E. Schuman (eds.). 1983. Soils and overburden in reclamation of arid/semiarid mined lands. Proceedings of the symposium. Univ. Wyo. Agr. Exp. Sta., Laramie.

DiPalma, Joseph R. (ed.). 1971. Drill's Pharmacology in Medicine. McGraw-Hill Book Co., Inc. New York, NY.

Dodge, B.F. and W. Zabban. 1952. Disposal of plating room wastes. IV: Batch volatilization of hydrogen cyanide from aqueous solutions of cyanides. Plating, Oct.—Nov. 1952.

Doudoroff, P. 1956. Some experiments on the toxicity of complex cyanides to fish. Sewage. Ind. Wastes 28:1020.

Doudoroff, P. 1976. Toxicity to fish of cyanides and related compounds: a review. Ecol. Res. Series, EPA 600/3-76-038, Environ. Res. Lab., U.S. Environmental Protection Agency, Duluth, MN.

Doudoroff, P., G. Leduc and C.R. Schnieder. 1966. Acute toxicity to fish or solutions containing complex met cyanides in relation to concentrations of molecular hydrocyanic acid. Trans. Am. Fish Soc. 95: 6-22.

Dudley, H.C., T.R. Sweeney and J.W. Miller. 1942. Toxicology of acrylonitrile (viral cyanide). II: studies effects of daily inhalation. Jour. Ind. Hyg. Toxicol 24:255.

Elliott, J.G., R.D. Jarrett and J.L. Ebling. 1982. Annual snowmelt and rainfall peak-flow data on selected foothills region streams, South Platte River, Arkansas River and Colorado River Basins, Colorado. U.S. Geological Survey, Open file report 82-426, Lakewood, CO.

Everett, L.G., L.D. Wilson and E.W. Holyman. 1984. Vadose zone monitoring for hazardous waste sites. Noyes Data Corporation. Park Ridge, NJ.

Everett, L.G. and L.G. McMillion. 1985. Operational ranges for suction lysimeters. Ground-Water Monitoring Rev. Sum. 1985.

Fassett, D.W. 1963. Cyanides and nitriles. *In* D.W. Fassett and D.D. Irish (eds.). Industrial hygiene and toxicology, Vol. 2. 2nd edition. John Wiley and Sons, Inc., New York, NY.

Fung, R. (ed.). 1980. Protective barriers for containment of toxic materials. Pollution Technology Review No. 66. Noyes Data Corporation, Park Ridge, NJ.

Garner, H.F. 1974. The origin of landscapes. Oxford University Press, New York, NY.

Gosselin, R.E. and M.N. Gleason. 1976. Clinical toxicology of commercial products; acute poisoning. 4th edition. Williams and Watkins Co., Baltimore, MD.

Gray, D. H. and A. T. Leiser. 1982. Biotechnical slope protection and erosion control. Van Nostrand Reinhold Company, New York, NY.

Hargis, N.E. and E.F. Redente. 1984. Soil handling for surface mine reclamation. J. Soil Water Cons. 39:300.

Hayes, W.T. Jr. 1967. The 90-dose LD$_{50}$ and a chronicity factor as measures of toxicity. Toxicol. Appl. Pharmacol. 11:327.

Heinen, H.J., D.G. Peterson and R.E. Lindstrom. 1978. Processing gold ores using heap leach-carbon adsorption methods. U.S.D.I. Bur. Mines. Info. Cir. 8770, Washington, DC.

Heinen, H.J. and D. Porter. 1969. Experimental leaching of gold from mine waste. U.S.D.I. Bur. Mines. RI 7250, Washington, DC.

Howard, J.W. and R.F. Hanzal. 1955. Chronic toxicity for rats of food treated with hydrogen cyanide. Jour. Agri. Food Chem. 3:325.

Huiatt, J.L., J.E. Kerrigan, F.A. Olsen and G.L. Potter. (eds.). 1983. Cyanide from mineral processing. Proceedings from a workshop. Utah Mining and Mineral Resources Research Institute, Feb. 2-3, 1982.

Jarrett, R.D. and J.E. Costa. 1983. Multidisciplinary approach to the flood hydrology of foothill streams in Colorado. *In* International symposium on hydrometeorology, Am. Water Res. Assoc., Bethesda, MD.

Johnson, V.R., Jr. 1983. Monitoring ground water at cyanide leach mining sites. Ground-Water Monitoring Rev. winter 1983, p. 144-147.

Jurinak, J. J. 1982. Overview of soils considerations in high altitude revegetation. *In* Cuany, R. L. and J. Etra (eds.). Proceedings: High-altitude revegetation workshop no. 5. Colorado Water Resources Research Institute, Information Series No. 48, Colorado State University, Fort Collins.

Knox, R.C., L.W. Canter, D.F. Kincannon, E.L. Stover and C.H. Ward. 1984. State-of-the-art of aquifer restoration, EPA/600/2-84/182a, 182b. Robert S. Kerr Environmental Research Laboratory, Ada, OK.

Lind, D.T., L.L. Smith, Jr. and S.J. Broderius. 1977. Chronic effects of hydrogen cyanide on the fathead minnow. Jour. Water Poll. Cont. Fed. 49:262-268.

Lindorff, D.E. and K. Cartwright. 1977. Ground-water contamination: Problems and remedial actions, EGN 81, Illinois State Geological Survey, Urbana.

Mallow, Alex. 1981. Hazardous waste regulations. An interpretive guide. Van Nostrand Reinhold Company, New York, NY.

Masson, O. 1907. Destruction of cyanide with hydrogen peroxide. Jour. Chem Soc. 91:1449-1474.

Mathre, O.B. and F.W. DeVries. 1981. Destruction of cyanide in gold and silver mine process water, gold and silver leaching, recovery and economics. p. 77-82. *In* Proceedings from the 110th AIME Meeting, Chicago, IL, February 22-26, 1981.

McKell, C. M. 1982. New developments in soil amendments—a biologist's point of view. *In* Cuany, R. L. and J. Etra (eds.). Proceedings: High-altitude revegetation workshop no. 5. Colorado Water Resources Research Institute, Information Series No. 48, Colorado State University, Fort Collins.

Merwin, R.W., G.M. Potter and H.J. Heinen. 1969. Heap leaching of gold ores in northeastern Nevada. Presentation at AIME Annual Meeting, Washington, DC, February 1969, AIME Preprint 60-AS-79.

Murrmann, R.P. and F.R. Koutz. 1972. Role of soil chemical processes in reclamation of wastewater applied to land, p. 48-76. *In* Wastewater management by disposal on the land. Special report 171, U.S. Army cold regions research and engineering laboratory, Hanover, NH.

National Institute for Occupational Safety and Health. 1976. Criteria for recommended standard, occupational exposure to hydrogen cyanide and cyanide salts. V. 5 Gov. Printing Office, NIOSH Pub. No. 77-108. Washington, DC.

Oseid, D. and L. Smith. 1979. The effects of hydrogen cyanide on *Asellus communis* and *Gammarus pseudolimnaeus* and changes in their competitive response when exposed simultaneously. Bull. Environ. Contam. Toxicol. 21:439-447.

Owerbach, D. 1978. The instability of free cyanide in photographic processing effluents. J. App. Photo. Engl. 4:72-76.

Pizzaro, R.J, J.D. McBeth and G.M. Potter. 1974. Heap leaching practice at the Carlin Gold Mining Company, Carlin, NV p. 253-267. *In* Solution mining symposium, AIME.

Potter, A.L. 1950. The successful treatment of two recent cases of cyanide poisoning. Br. Jour. Ind. Med. 7:125.

Prentis, A.M. 1937. Systemic toxic agents. *In* Chemicals in war. McGraw-Hill Book Co., Inc., New York, NY.

Reed, A.K. et al. 1971. An investigation for removal of cyanide from electroplating waste, EPA 12010 EIE 11/71.

Schiller, J.E. 1983. Removal of cyanide and metals from mineral processing waste waters. U.S. Bur. Mines, RI 8836, Washington, DC.

Schmidt, J.W., L. Simovic and E. Shannon. 1981. Natural degradation of cyanides in gold milling effluents, a progress report. Paper presented at the Cyanide and the Gold Mining Industry Seminar, 1981. Wastewater Technology Center, Environment Canada.

Siecrist, J.H. and W.H. Powers. 1966. General chemistry. D. Van Nostrand Co., Princeton, NJ.

Smith, R. 1980. Mammalian toxicology and human health effects. p. C-1—C-36. *In* Ambient water quality criteria for cyanides. EPA 440/5-80-037, U.S. Environmental Protection Agency, Washington, DC.

Smith, L.L. Jr., S.J. Broderius, D.M. Oseid, G.L. Kimball and W.M. Koenst. 1979. Acute and chronic toxicity of HCN to fish and invertebrates. Ecol. Res. Ser., EPA 600/3-79-009, U.S. Environmental Protection Agency, Washington, DC.

Stephan, C.E. and Gentile, J. 1980. Aquatic life toxicology. p. B-1 *In* Ambient water quality criteria for cyanides. EPA 440/5-80-037, U.S. Environmental Protection Agency, Washington, DC.

Thornberg, A.A. 1982. Plant materials for use on surface-mined lands in arid and semi-arid regions. U.S.D.A. SCS-TP-157, EPA-600/7-79-134, Government Printing Office, Washington, DC..

Towill, L.F., J.J. Drury, B.L. Whitfield, E.B. Lewis, E.L. Galyan and A.J. Hammers. 1978. Reviews of the environmental effects of pollutants: V. Cyanide. Interagency Report, Oak Ridge National Laboratory Report No. ORNL/EIS-81 and EPA Report No. EPA-600/1-78-027, U.S. Environmental Protection Agency, Washington, DC.

Trenholme, R.B. 1982. Soil survey—Accomodating user needs. *In* Cuany, R. L. and J. Etra (eds.). Proceedings: high-altitude revegetation workshop no. 5. Colorado Water Resources Research Institute, Information Series No. 48, Colorado State University, Fort Collins.

U.S. Environmental Protection Agency. 1976. Quality criteria for water, Washington, D.C.

U.S. Environmental Protection Agency. 1985. Handbook for remedial action at waste disposal sites. EPA-625/6-85-006, Cincinnati, OH.

U.S. Environmental Protection Agency. 1985. Ambient water quality criteria for cyanide–1984. EPA 440/5-84-028, Washington, D.C.

U.S. Forest Service. 1979. User guide to soils. Mining and reclamation in the west. General Tech. Rep. INT-68, Intermountain Forest and Range Experiment Sta., Ogden, UT.

U.S. Forest Service. 1983. Vegetative rehabilitation and equipment workshop, 37th annual report. Equipment Development Center, Missoula, MT.

Vennesland, B., E.E. Conn, C.J. Knowles, J. Westley and F. Wissing. 1981. Cyanide in biology. Academia Press, London.

Appendix

State Permits and Regulatory Agencies

This appendix gives a listing of permits and regulatory agencies for various western states. This appendix is not intended to be a comprehensive listing of required permits for cyanide operations. The agencies and permits given in the table generally refer to requirements for reclamation. Several states do not have programs for reclamation permits. Such states, however, do have requirements for notification of state authorities. No attempt has been made to list all administrative licenses or permits dealing with water quality, air quality, or mine safety.

ALASKA

Permit:	Upland Locatable Mineral Rights Certificate of Location
Agency:	Division of Mining Department of Natural Resources P.O. Box 7016 Anchorage, AK 99510 (907) 561-2020
Comments:	*Most gold mines in Alaska are placer operations, though some small mines may use cyanide. There is no specific reclamation law. Primary permits required would be for air and water quality. As of July 1, 1986 the Division of Mining will be merged with the Alaska Geological Survey; the name of this new combined agency has not been announced.*

ARIZONA

Permit: Mine Start-up/Shut Down Notice of Approval

Agency:
Arizona State Mine Inspector
705 State Capitol, West Wing
Phoenix, AZ 85007
(602) 255-5971

Other permits or agencies: Mineral Extraction and Metallurgical Processing Permit, *contact—*

Arizona Water Rights Office
Arizona Department of Natural Resources
99 E. Virginia St.
Phoenix, AZ 85004
(602) 255-1554

Ground Water Quality Protection Permit, *contact—*

Arizona Department of Health Services
Division of Environmental Health Services
2005 N. Central Ave., Room 300
Phoenix, AZ 85004
(602) 257-2270

Comments: *Some agencies will be reorganized in Arizona to form a separate Department of Environmental Quality in 1987.*

CALIFORNIA

Permit: County Special Use Permit

Agency: *See comment below*

Comments: *California has a permitting system in which local county governments are usually the lead approving agencies. A comprehensive treatment of mine permitting in California is given by Deem and Hillman (1984),* California Exploration and Mine Permitting (the Eight Mother Lode Counties). *Complete citation is given in the bibliography of this handbook.*

COLORADO

Permit: Mining and Reclamation Permit

Agency:
Colorado Division of Mined Land Reclamation
1313 Sherman St.
Denver, CO 80203
(303) 866-3567

IDAHO

Permit: Reclamation Permit

Agency: Bureau of Minerals
Department of Lands
Statehouse Bldg., B-19
Boise, ID 83720
(208) 334-3569

Other permits or agencies: Mine Tailing Impoundment Structure (for embankments > 30 feet in height), *contact—*

Dam Safety Section
Department of Water Resources
450 W. State St.
Boise, ID 83720
(208) 334-4009

Comments: *Current regulatory program is geared mainly to leases on state lands. A committee is currently at work in Idaho to investigate the desirability of a regulatory program specific for cyanide operations. As of the date of this handbook, recommendations of the committee have not been made public, and no legislative action has been taken. For more information, contact—*

Division of Environment
Idaho Department of Health and Welfare
450 W. State St.
Boise, ID 83720
(208) 334-4250

MONTANA

Permit: Mining and Reclamation Permit

Agency: Hard Rock Bureau
Reclamation Division
Department of State Lands
1612 11th Ave.
Helena, MT 59601
(406) 444-2074

Comments: *Under the Montana Environmental Protection Act (MEPA), proposed projects undergo a Preliminary Environmental Review which may determine that an Environmental Impact Statement is required.*

NEW MEXICO

Permit:	Annual Mine Registration
Agency:	State Mine Inspector Bureau of Mine Inspection 2825-E Broadbent Pkwy. N.E. Albuquerque, NM 87107 (505) 842-3055
Other permits or agencies:	*Water discharge permits for operations involving cyanide, contact—* Environmental Improvement Division Department of Health and Environment P.O. 968 Santa Fe, NM 87504-0968 (505) 473-3473
Comments:	*Santa Fe County has adopted its own mining reclamation ordinance governing operations within county jurisdiction.*

NEVADA

Permit:	Notification: Opening and Closing of Mining Operations
Agency:	Division of Mine Inspection Department of Industrial Relations 1380 S. Curry Carson City, NV 89710 (702) 885-5243

NORTH DAKOTA

Permit:	Exploration Permit Application—Subsurface Minerals
Agency:	State Geologist North Dakota Geological Survey University Station Grand Forks, ND 58202 (701) 777-2231

OREGON

Permit: Mining and Reclamation Permit

Agency:
Mined Land Reclamation
State Department of Geology and Mineral Industries
1534 Queen Ave. S.E.
Albany, OR 97321
(503) 967-2039

SOUTH DAKOTA

Permit: Surface Mining Permit, Underground Mining Permit, Solution Mining Permit, Exploration Permit

Agency:
Surface Mining Program
Department of Water and Natural Resources
413 Foss Bldg.
Pierre, SD 57501
(605) 773-4201

UTAH

Permit: Approved Notice of Intention to Commence Mining Operations

Agency:
Coordinator of Mined Land Development
Utah Division of Oil, Gas and Mining
3 Triad Center, Suite 350
Salt Lake City, UT 84180
(801) 538-5340

WASHINGTON

Permit: Surface Mining Permit (applies only to operations >10,000 TPY or >2 acres surface disturbance)

Agency:
Department of Natural Resources
Division of Geology and Earth Resources
Olympia, WA 98504
(206) 459-6372

Other permits or agencies:
Department of Ecology
Mail Stop PV-11
Olympia, WA 98504
(206) 459-6000

Comments: *State EIS process mandated by SEPA.which is administered by the Department of Ecology.*

WYOMING

Permit: Permit to Mine

Agency: Land Quality Division
Department of Environmental Quality
Herschler Bldg., 3rd Floor
122 W. 25th St.
Cheyenne, WY 82002
(307) 777-7756

DU PONT

SODIUM CYANIDE

Properties, Uses, Storage and Handling

DU PONT

NOTICE: SODIUM CYANIDE MAY BE FATAL IF SWALLOWED OR INHALED. CONTACT WITH ACIDS OR WEAK ALKALIES LIBERATES POISONOUS GAS. CAUSES EYE BURNS AND MAY IRRITATE SKIN. See Personal Safety, First Aid and Medical Treatment.

DO NOT USE SODIUM CYANIDE AS A PESTICIDE

FOR EMERGENCY ASSISTANCE CALL:

DU PONT: (901) 357-1546
This is an emergency sodium cyanide "HOT LINE." Do not use for routine technical or commercial information.

CHEMTREC: (800) 424-9300
See "TRANSPORTATION EMERGENCIES" page 9.

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INTRODUCTION

Du Pont sodium cyanide (NaCN) is available in two convenient all-purpose forms: a briquette form (CYANOBRIK® sodium cyanide) and a granular form (CYANOGRAN® sodium cyanide). The briquettes of CYANOBRIK are of uniform size, average 13 grams or about ½ ounce in weight and have overall dimensions of approximately 3.5 × 3.5 × 1.3 cm or 1⅜ × 1⅜ × ½ in. They are resistant to breakage and dusting, easy to scoop up, and readily soluble in water. The white granules of CYANOGRAN are also of uniform size so they flow better and generate a minimum of dust. The crystalline solid passes 99% through USS Sieve No. 2; 10% maximum through USS Sieve No. 50. Also available is a granular compounding grade which will pass 100% through USS Sieve No. 8, and a reagent grade meeting A.C.S. Specifications.

The Chemical Abstract Service Registry Number for NaCN is 143-33-9.

SPECIFICATIONS AND TYPICAL ANALYSIS

	Specifications	Typical Analysis*
Sodium cyanide, %	99, min	99
Sodium hydroxide, %	0.5, max 0.03, min	0.1
Sodium formate, %	0.5, max	0.3
Sodium chloride, %		0.01
Water, %		
briquette	0.1, max	0.05
granular	0.2, max	0.06
Sulfides (as S), ppm		<1
Carbonates (as Na_2CO_3), %		0.5

**The above table gives typical analyses based on historical production performance. Du Pont does not make any express or implied warranty that future production will demonstrate or continue to possess these typical analyses.*

PHYSICAL PROPERTIES

Formula weight	49.007
Melting point, F	1044
C	562
Boiling point, F	2786
C	1530
Specific gravity, solid—77 F, 25 C	1.60
Specific gravity, liquid—1560 F, 850 C	1.19
Heat of formation ($\Delta H°_f$)	
77 F, Btu/lb	−788
25 C, cal/g	−438
25 C, kJ/kg	−1833
Specific heat (78-163 F, 26-73 C)	
Btu/lb·F or cal/g·C	0.335
kJ/kg·K	1.402
Heat of fusion (mp), Btu/lb	77
cal/g	43
kJ/kg	179
Heat of vaporization (bp), Btu/lb	1309
cal/g	722
kJ/kg	3041
Vapor pressure, mm Hg	
1470 F, 800 C	0.76
2190 F, 1200 C	89.8
2480 F, 1360 C	314.0
Solubility in water, g NaCN/100 g water (See Fig. 1)	
−4 F, −20 C	35.4
68 F, +20 C	58.3

USES AND APPLICATIONS

The metal, chemical and mining industries are the principal consumers of sodium cyanide. Typical uses include—

Electroplating

Cyanide brass, cadmium, copper, gold, silver, and zinc baths deposit decorative and/or functional metal coatings on a variety of substrates. The good throwing power of the electrolyte causes relatively uniform deposition of the metal on intricately shaped parts. Small amounts of special additives in the baths give bright metal deposits even on recessed surfaces of the work. Cyanide electroplating baths are versatile: they are capable of high production rates whether the work consists of massive or minute parts.

Ore Extraction and Ore Flotation

The cyanide process for extracting gold and silver from low-grade ores uses aqueous solutions of sodium cyanide with oxygen (air) to convert the noble metal (M) to soluble NaM $(CN)_2$, from which M can be recovered either by precipitation with zinc dust or aluminum powder, carbon absorption, or by electrowinning.

In the flotation of galena (lead sulfide) to separate it from mixed ores containing sphalerite (zinc sulfide) and pyrite (iron sulfide), sodium cyanide acts as a depressor; that is, it reduces the tendency of gangue materials to travel along on the froth and so impair the separation. Sodium cyanide finds similar use in the separation of pentlandite from pyrrhotite and molybdenite from copper concentrates by flotation. It is also used to purify the molybdenite by extraction of copper impurities.

Case Hardening Steel

Molten salt baths containing 10-30% sodium cyanide find extensive use for case hardening steels at temperatures below 1600 F (870 C). The molten bath process is fast, easy to operate, and yields mixed carbon-nitrogen cases that have excellent wear resistance and uniformity. The addition of activators or accelerators to the bath results in deeper cases than those obtained with plain cyanide baths, but nitrogen pickup is usually less.

The life of keen-edged tools improves when the high-speed steel is cyanide-nitrided in molten cyanide baths at about 1050 F (565 C).

Metal Cleaning

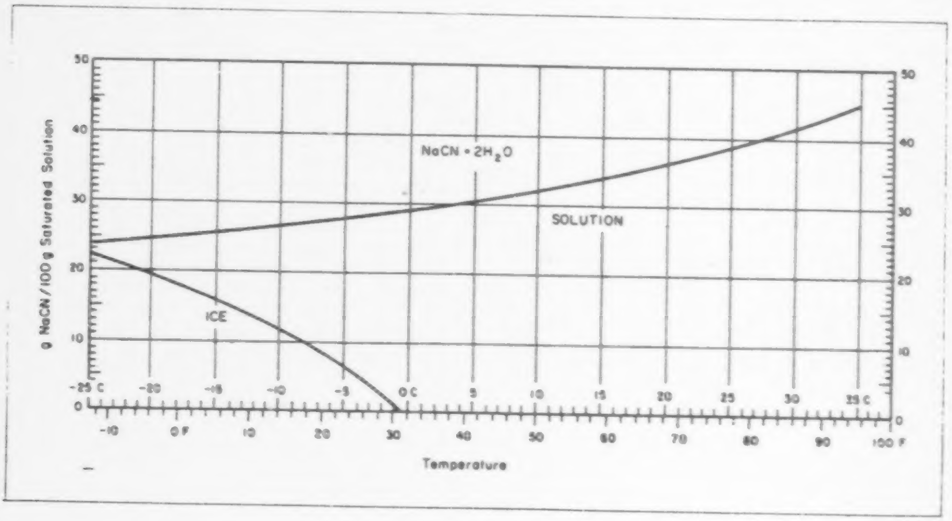
Aqueous solutions of sodium cyanide are effective metal cleaners, especially for smut removal after acid pickling.

Chemical Manufacture

Sodium cyanide is used to make other chemicals that lead to such diverse products as drugs and vitamins, dyes and pigments, insecticides, sequestrants, polymers, and catalysts. (See CHEMICAL REACTIONS SECTION).

In any synthesis or formulation involving sodium cyanide, no cyanide compound should survive in the final product as an impurity. This is especially important with regard to consumer products.

FIGURE 1. Solubility of Sodium Cyanide in Water



CHEMICAL REACTIONS

The most hazardous property of sodium cyanide is its reaction with acids to form lethal hydrogen cyanide gas.

Sodium cyanide deliquesces in moist air. Crystals of the dihydrate, $NaCN \cdot 2H_2O$, form when saturated solutions of sodium cyanide cool at temperatures below 95 F (35 C). Sodium cyanide dissolves in methanol[*] [6.05 g/100 mL saturated solution at 59 F (15 C)]. It also dissolves in liquid ammonia[*] [3.7 g/100 mL NH_3 at −27.4 F (−33 C)].

Sodium Cyanide Reactions in Water

Sodium cyanide (NaCN) dissolved in water forms an equilibrium between ionized sodium cyanide and highly volatile hydrogen cyanide (HCN). In sodium cyanide solutions, HCN concentrations must be kept low to avoid toxic fumes. HCN formation varies with pH, cyanide concentration, and temperature. At pH 7 or less, essentially all of the cyanide will be in the HCN form. To suppress HCN formation in typical concentrated sodium cyanide make-up solution, a pH of 12 is required at ambient temperature (See Fig. 3). A pH of 12 generally provides a small safety factor; the critical importance of avoiding toxic HCN fumes makes a margin of safety essential. Higher temperatures and higher solution concentrations increase HCN fumes.

When making a cyanide solution, the proper procedure is to add about 0.5% sodium hydroxide (caustic) or 50 lb caustic/1,000 gallons water, *before* adding the cyanide. More caustic will not be chemically harmful to the cyanide, but increased alkalinity increases eye hazards from splashes. If process chemistry requires lower pH storage or use, adequate precautions in design and operation must be taken to protect against HCN fumes and HCN polymerization or hydrolysis.

Hydrogen cyanide molecules will polymerize to form the extremely inert HCN polymer. In dilute solutions, HCN polymer will generate colors ranging from pale yellow to dark reddish brown. In stronger solutions, a dark brown precipitate resembling iron rust can form which will

FIGURE 2. **Densities of NaCN Solutions**

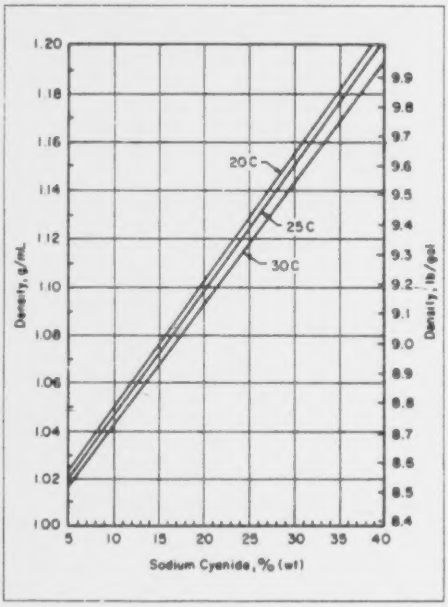
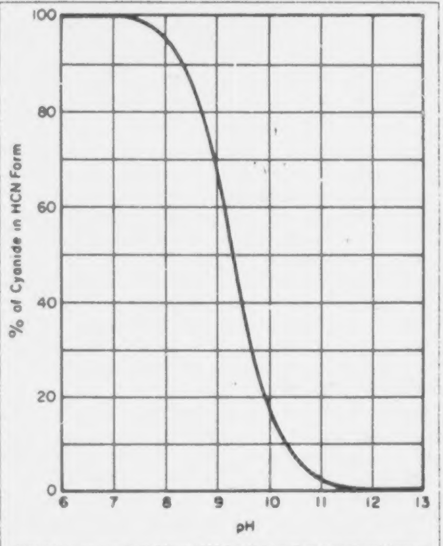


FIGURE 3. **Effect of pH on Cyanide Ionization**



Data based on work by D. Milne, 1950, for dilute sodium cyanide solutions at ambient temperature. Toxic HCN fumes increase as temperatures and solution concentrations increase requiring higher pH for safe operation.

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[*] Also a Du Pont product

interfere with heat transfer, plug pumps, orifices, etc. and may cause significant cyanide loss. Again, high pH values give low HCN concentration and reduce the tendency for polymer formation.

Cyanide also reacts with water to form ammonia and formate ions. In the acid pH range, hydrolysis products are formic acid and ammonium salts. Alkaline solutions produce formate salts and volatile ammonia. With strong solutions, the volume of ammonia evolved can cause dangerous pressure build-up. One gallon of 30% sodium cyanide solution can produce more than 25 ft^3 of ammonia. For this reason, extra vent capacity is recommended for storage tanks.

Ordinarily the reaction between cyanide and water proceeds slowly. However, the reaction rate increases exponentially with an increase in temperature, having a critical range around 60-70 C (140-158 F). At temperatures below this range, the reaction can be controlled by cooling and, where practical, by dilution. At higher temperatures, however, the reaction can be uncontrollable and may proceed until substantially all the cyanide has been consumed. For this reason, temperature control and adequate cooling and venting capacity are needed. Sodium cyanide solution storage tanks should be equipped with facilities for measuring and controlling the temperature of the solution (see EQUIPMENT, page 17). Heating may be needed to assist in dissolving the NaCN (see Figure 1) and to prevent freezing (see Figure 5). Cooling helps to minimize cyanide loss in hot weather (see Figure 4) and could be critically important if the hydrolysis reaction begins to generate heat faster than it can be dissipated to the surroundings.

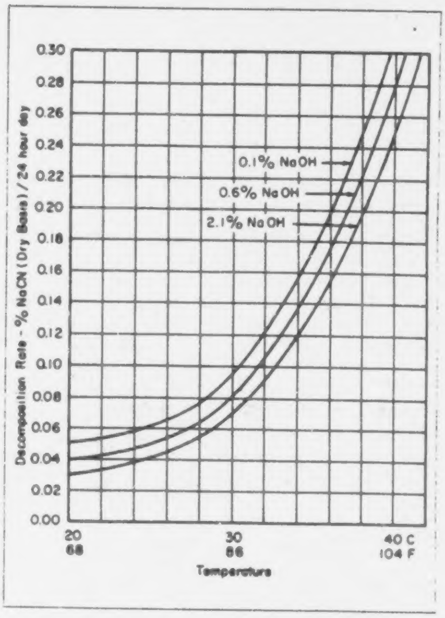
All the reactions discussed above consume a portion of the stored cyanide, and all are inhibited by maintaining low solution temperature and high pH.

If special precautions are taken, acidification of sodium cyanide to produce HCN gas for a chemical reaction is an acceptable procedure; but only when handled by technically qualified people, and after detailed planning. CAUTION: The accumulation and storage of liquid or gaseous HCN should not be considered until its properties and the required safety precautions for handling it have been studied carefully. In addition to toxicity considerations, violent exothermic polymerization reactions can occur with HCN even in the absence of air or oxygen.

Other Reactions

Mild oxidants, such as alkaline hypochlorite solutions, hydrogen peroxide solutions,[a] and permanganate solutions can oxidize cyanide to sodium cyanate. The reaction finds wide use in the control of cyanides in effluents.[b] These oxidation reactions must be done in dilute solutions to avoid formation of highly toxic gases. (See "Waste Disposal".)

FIGURE 4. **Decomposition Rate of NaCN Solutions**



NOTE: The % NaOH shown above is the concentration in the final solution. The NaCN (as shipped-containing 0.1% NaOH), when diluted to a 30% solution, will have only 0.03% NaOH in the final solution unless additional NaOH is added. (Decomposition rates based on Du Pont experimental data using 35% NaCN solution.)

Strong oxidants, such as nitrates, nitrites, and chlorates react violently when added to molten sodium cyanide (or vice versa).[c]

With the exception of lead and platinum, most metals (when finely divided) dissolve in aqueous sodium cyanide in the presence of oxygen.

Alkaline solutions of sodium cyanide dissolve water-insoluble cuprous cyanide and zinc cyanide with formation of sodium tricyanocuprate and sodium tetracyanozincate, respectively.

Reacting an alkyl halide, sulfate, or toluene-sulfonate (p-$CH_3C_6H_4SO_2OR$) with sodium cyanide in aqueous alcohol, DMF[a], or similar aprotic solvent leads to an alkyl cyanide (nitrile). Fusing a sodium aryl sulfonate with sodium cyanide yields the aryl nitrile; for example, sodium benzene-sulfonate (sodium phenyl sulfonate) gives benzonitrile (phenyl cyanide).

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[a] Also a Du Pont product

[b] See WASTE DISPOSAL on page 18.

[c] See "Manual of Hazardous Chemical Reactions," NFPA No. 491 M-1975, published by the National Fire Protection Assn., 470 Atlantic Ave., Boston, MA 02210.

Hydrogen cyanide, generated by reacting an acid with sodium cyanide, is capable of adding to isolated double bonds and to the carbonyl group of an aldehyde or ketone. In the case of acetophenone, for example, the corresponding cyanohydrin forms which hydrolyzes to atrolactic acid [α-phenyllactic acid, $C_6H_5(CH_3)C(OH)COOH$][c]. Similarly, when preparing an α-amino acid from an aldehyde or ketone by Strecker synthesis, the hydrogen cyanide and ammonia needed can come from ammonium cyanide formed in the reaction of sodium cyanide with ammonium chloride.

One method of synthesizing the sodium salt of ethylenediaminetetraacetic acid (tetrasodium EDTA, a chelating agent) combines ethylenediamine with formaldehyde[a] and sodium cyanide in hot (175 F, 80 C) alkaline solution.

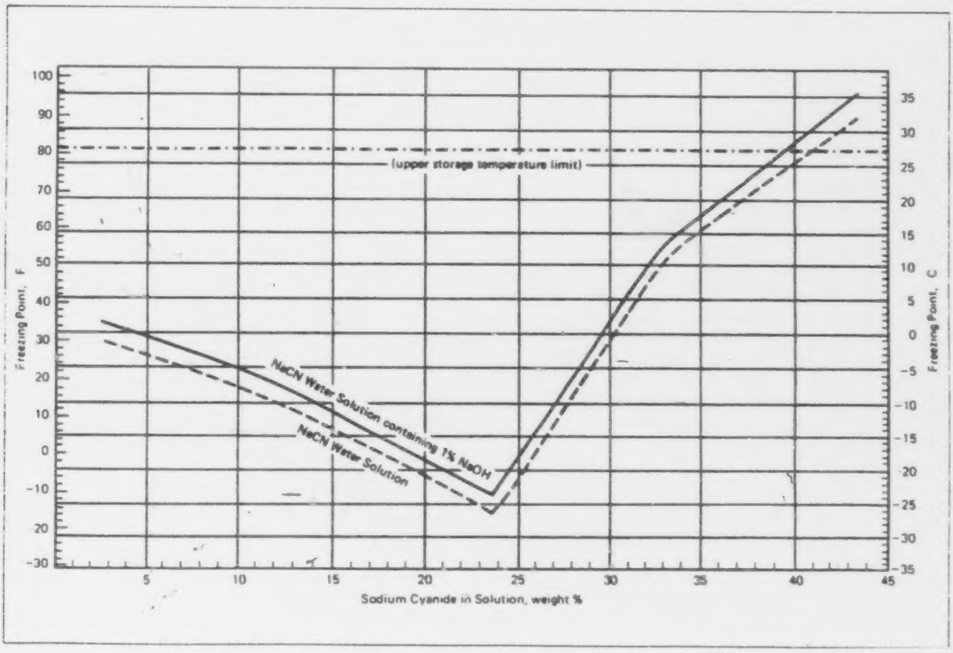
PERSONAL SAFETY, FIRST AID AND MEDICAL TREATMENT

HEALTH HAZARDS

Because of the toxicity of sodium cyanide, all persons working with it should be completely familiar with and observe the established safety practices.

Sodium cyanide is a rapidly fatal poison when taken internally. Poisoning may occur if sodium cyanide dust is inhaled. Prolonged contact with the skin may cause irritation and possibly poisoning, particularly if there are open wounds or skin abrasions. Sodium cyanide is alkaline and causes eye burns.

FIGURE 5. Freezing Points of Sodium Cyanide Solutions



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[a] Also a Du Pont product

[c] E. L. Eliel and J. P. Freeman, *Organic Syntheses*, Wiley, New York, Coll. Vol. 4, 58-62 (1963).

SODIUM CYANIDE IN CONTACT WITH ACIDS OR WEAK ALKALIES LIBERATES HIGHLY TOXIC AND FLAMMABLE HYDROCYANIC ACID (HCN) GAS. ALSO, TOXIC AMOUNTS OF HCN CAN BE LIBERATED FROM WATER SOLUTIONS OF SODIUM CYANIDE (SEE PP 4-5).

The U.S. Department of Labor (OSHA) has ruled that an employee's exposure to cyanide in any eight-hour workshift of a 40-hour week shall not exceed a time-weighted average of 5 mg of cyanide (calculated as CN) per cubic meter of air. It also cautions that since cyanide may penetrate the skin, especially if broken, control of vapor or dust inhalation alone may not be sufficient to prevent absorption of an excessive dose (Title 29 CFR 1910.1000 Air Contaminants).

SAFETY PRECAUTIONS

The Basic Safety Precautions are:

1. Do not breathe dust or gas. Wear an approved dust respirator when there is danger of inhaling cyanide dust. The respirator should be one approved by the Mining Enforcement and Safety Administration or by the National Institute for Occupational Safety and Health (NIOSH). See pp. 5-7 of NIOSH's Recommended Standard for Occupational Exposure of Hydrogen Cyanide and Cyanide Salts, 1977 (No. 757-009/22).

2. Avoid skin contact with cyanides. Never permit contact with open wounds or skin abrasions. Wear protective gloves when handling solid cyanides. Wear rubber gloves when handling cyanide solutions. Wash hands and gloves thoroughly with running water after handling cyanides.

3. Do not get in eyes. Wear approved chemical splash goggles when handling cyanide solutions and when there is danger of splashing.

4. Immediately sweep up any spilled cyanide and place in a suitable container. Treat contaminated area with dilute hypochlorite solution to destroy the cyanide. Flush area with water; comply with Federal, State or local regulations. If approved, drain to neutral chemical waste sewer.

5. Take every precaution to keep acids or weak alkalies from contacting sodium cyanide. Do not store with acids or weak alkalies.

6. Do not eat, drink, or smoke in areas where cyanide is present. Do not handle or store food or beverages in cyanide areas.

7. Store sodium cyanide in a dry, well-ventilated area. Containers should be kept closed and their contents dry.

Symptoms of Cyanide Poisoning

Personnel should be constantly alert and ready to take immediate action in case of exposure to cyanide. The following are symptoms of cyanide poisoning. They can result from many other causes, but these symptoms should be investigated when they occur around cyanide areas.

- Reddening of the eyes
- Irritation of the throat
- Palpitation
- Difficulty in breathing
- Salivation
- Nausea
- Headache
- Weakness of arms and legs
- Giddiness
- Collapse and convulsions
- Numbness

Effects of Exposure to HCN Vapor

The following toxicity data are the "Reported (Estimated) Human Responses to Various Concentrations of HCN Vapors"*:

300 ppm	Rapidly fatal
100-200 ppm	Fatal within ½ to 1 hour
45-54 ppm	Tolerated for ½ to 1 hour without immediate or delayed effects
20-40 ppm	Slight symptoms after several hours
10 ppm	Threshold Limit/Time-Weighted Average for a normal 8-hour workday
2-5 ppm	Odor threshold

These numbers should be considered reasonable estimates, not exact data, and are more conservative than some literature references. Variations will exist with different people. The "rapidly fatal" exposure level of 300 ppm assumes no first aid or medical treatment has been given. Prompt administration of these recovery techniques has proven very effective. Emphasis must be placed on quick action, however.

In case of overexposure to HCN, quick action is required to sound the alarm, remove the victim from the contaminated area and provide treatment. With prompt treatment, recovery is usually rapid and complete with no after-effects. Unlike many poisons, cyanide is not cumulative in body organs. While cyanide poisoning is rapidly fatal, no case should be considered hopeless; as long as there is a heartbeat, treatment should be continued. (Only a physician can certify death).

FIRST AID AND MEDICAL TREATMENT

A. Introduction

The following points are important:

1. The treatment of cyanide poisoning is divided into two parts—First Aid and Medical Treatment. First Aid is the prompt action taken to prevent further harm or death and to put the victim in the best condition for later treatment, if needed. First Aid is

---

*NIOSH Criteria Document, *Hydrogen Cyanide and Cyanide Salts* (1976) generally given by the layman before a doctor arrives. Medical Treatment is administered by the physician.

2. A key to treatment of cyanide poisoning is the rapid administration of antidotes and oxygen. Always have on hand a supply of the materials listed in Sections B and C below for immediate use.
3. Actions to be taken in case of exposure should be studied and planned *before* beginning work with cyanides.
4. *In case of cyanide contact, start treatment immediately. Call a physician.*

B. First Aid Supplies

First aid supplies should be located in the cyanide area, and immediately accessible at all times. They should be inspected at least twice a week by the individuals who would be using them in an emergency. The following items are required:

1. Two boxes (2 dozen) of amyl nitrite pearls. CAUTION: UNSTABLE. REPLACE EVERY 1-2 YEARS. Store in cool dark location.
2. Oxygen resuscitators. The Flynn Series III resuscitator, from O-TWO Systems, has performed satisfactorily since it is light weight, rugged, and easy to use. For information, contact Mid-South Oxygen Company Memphis, TN (901) 396-5058, or O-TWO Systems of Canada, Mississauga, Ontario, (416) 677-9410. A good practice is to keep six amyl nitrite pearls in each resuscitator box.
3. Two 1-pint bottles of 1% sodium thiosulfate solution.
4. A set of instructions on First Aid Treatment.

C. Medical Supplies (For Use Only By A Physician)

A "Medical Supplies Kit" containing the following supplies, should be conveniently located outside the cyanide area, and checked at regular intervals by a responsible person.

1. Two boxes (2 dozen) of amyl nitrite pearls. CAUTION: UNSTABLE. REPLACE EVERY 1-2 YEARS. Store in cool, dark location.
2. Two sterile ampules of sodium nitrite solution (10 mL of a 3% solution in each).
3. Two sterile ampules of sodium thiosulfate solution (50 mL of a 25% solution in each).
4. Two 1-pint bottles of 1% sodium thiosulfate solution.
5. One 10 mL sterile syringe. One 50 mL sterile syringe. Two sterile intravenous needles. One tourniquet.
6. One stomach tube.
7. One dozen gauze pads.
8. A set of instructions on Medical Treatment.

D. First Aid—Directions for Giving Antidote

1. If Patient Is Conscious and Breathing

For inhalation and/or absorption, if the victim is conscious, oxygen may be all that is needed. But if victim is not fully conscious or shows signs of poisoning, follow procedure in 2 below.

2. If Patient Is Unconscious But Breathing

Break an amyl nitrite pearl* in a cloth and hold lightly under the patient's nose for 15 seconds, repeating 5 times at about 15-second intervals. If necessary, repeat this procedure every 3 minutes with fresh pearls until 3 or 4 pearls have been given. Give oxygen from a resuscitator to aid recovery.

3. If Patient Has Stopped Breathing

Use oxygen resuscitator (preferably) or give artificial respiration until breathing starts. Also break an amyl nitrite pearl* in a cloth and hold lightly under the patient's nose for 15 seconds, repeating 5 times at about 15-second intervals. If necessary, repeat this procedure every 3 minutes with fresh pearls until 3 or 4 pearls have been given. When giving amyl nitrite to a victim not breathing, place the broken pearl under the resuscitator face-piece in such a way that it will not enter the mouth and choke the victim. A clip is helpful to hold the pearl.

E. First Aid—Inhalation Of Cyanide

Carry patient to fresh air. Have patient lie down. Administer antidote and oxygen (Section D) and remove contaminated clothing. Keep patient quiet and warm until physician arrives.

F. First Aid—Ingestion Of Cyanide

Administer antidote (Section D), then give patient one pint of 1% sodium thiosulfate solution (or plain or soapy water) by mouth and induce vomiting with finger in throat. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person. Use amyl nitrite or Medical Treatment procedures to aid detoxification from ingested cyanide.

G. First Aid—Skin Or Eye Contact

In case of skin contact with cyanide, immediately wash with plenty of water. For eye contact flush eyes with water for at least 15 minutes and see a physician.

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*WARNING: Since amyl nitrite is flammable, be careful to remove all sources of ignition, such as open flames or cigarettes, before breaking the pearls, especially with simultaneous administration of oxygen.

Any person giving first aid should be careful to keep the broken pearls away from his own mouth and nose; otherwise he may inhale sufficient amyl nitrite to become dizzy and be incompetent to give proper assistance.

H. Medical Treatment

1. Treatment of Cyanide Poisoning

While preparations for sodium nitrite and sodium thiosulfate injections are being made, break an amyl nitrite pearl* in a cloth and hold it lightly under the patient's nose for 15 seconds, repeating 5 times at about 15-second intervals. If victim is not breathing, use oxygen resuscitator or artificial respiration.

Discontinue administration of amyl nitrite and inject the solution of sodium nitrite (10 mL of a 3% solution) intravenously at the rate of 2.5 mL/minute, then immediately inject the sodium thiosulfate (50 mL of a 25% solution) at the same rate, taking care to avoid extravasation.

Watch patient continuously for 24-48 hours if cyanide exposure was severe. If there is any return of symptoms during this period, repeat the treatment, but use one-half the amounts of sodium nitrite and sodium thiosulfate solutions.

If signs of excessive methemoglobinemia develop (i.e., blue skin and mucous membranes, vomiting, shock and coma), 1% methylene blue solution should be given intravenously. A total dose of 1 to 2 mg/kg of body weight should be administered over a period of five to ten minutes and should be repeated in one hour if necessary. In addition, oxygen inhalation will be helpful and transfusion of whole fresh blood may be considered if there has been mechanical injury with bleeding or internal blood loss simultaneously with the cyanide exposure.

NOTE: A second injection of the antidotes on one-half the dosage initially used can be administered two hours after the initial treatment to help the patient ward off a relapse.

2. Treatment of Cyanide Sores

Should sores or skin irritation develop coincidentally with handling cyanide or its solutions, consult a physician or dermatologist.

3. Treatment Of Burns

Burns from molten cyanide mixtures are the same as those from alkalies and should be treated in a similar manner. Wash the burns thoroughly with warm water to remove all cyanide and alkalies present, then treat as any burn and consult a physician.

PACKAGES

Du Pont sodium cyanide in the form of briquettes (CYANOBRIK®), granular (CYANOGRAN®) and granular compounding grade is available in nonreturnable 100-lb net (108-lb gross) and 200-lb net (218-lb gross) steel drums. The 100-lb (45.4-kg) drums are shipped palletized 18 to a pallet and the 200-lb (90.7-kg) drums are 8 or 10 to a pallet. The drums can be stored 6 high in a warehouse.

CYANOBRIK is also available in 3000-lb net (3550-lb gross) FLO-BIN® containers, 24 to 44 bins per rail car or 12 bins per trailer truck.

Customers using sodium cyanide as a water solution can receive it dry in "Wet-Flo" tank cars (55 000 to 65 000 lb) and tank trucks (35 000 lb). The tank cars and trucks are unloaded by circulating premeasured water from a storage tank to dissolve the NaCN.

Drum shipments can be by ocean, rail freight or truck. Sodium cyanide is not mailable. The Department of Transportation (DOT) hazard classification is Poison B. A DOT Poison label is required. Truckloads, carloads and tank cars must carry "Poison" placards.

Due to changing government regulations, such as those of the Department of Transportation, Department of Labor, U.S. Environmental Protection Agency and the Food and Drug Administration, references herein to government regulations may be superseded. You should consult and follow the current government regulations, such as Hazard Classification, Labeling, Food Use Clearances, Worker Exposure Limitations and Waste Disposal Procedures for the up-to-date requirements for the products described in this literature.

TRANSPORTATION EMERGENCIES

If a shipment of Du Pont sodium cyanide is involved in an accident or emergency anywhere in the continental United States, make a toll-free call to the Chemical

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*See page 8.

Manufacturers Association's Chemical Transportation Emergency Center ("CHEMTREC") in Washington DC, (800)-424-9300. In the District of Columbia dial 483-7616. The information specialist on duty will ask the name and location of the caller, the name of the shipper, the product, the shipping point and destination; what happened, nature of any injuries, weather conditions, proximity to populated areas, etc. He will then give the caller recommendations for controlling the emergency situation until the shipper's specialist can relay help. "CHEMTREC" will immediately advise Du Pont of the emergency and one of our specialists will get in touch with the caller promptly.

In Canada, call Canadian Chemical Producers Association's TEAP (Transportation Emergency Assistance Plan). Phone:

Valleyfield, Que. (514)-373-8330
Maitland, Ont. (613)-348-3616
Niagara Falls, Ont. (416)-356-8310
Sarnia, Ont. (519)-339-7311
Copper Cliff, Ont. (705)-682-2881
Edmonton, Alb. (403)-477-8339
Vancouver, B.C. (604)-929-3441

UNLOADING AND TRANSFER

DRUMS

Drums of sodium cyanide should be stored in a dry building, segregated from acids, weak alkalies and strong oxidizing materials such as nitrates. Only the quantity required for immediate use should be removed from storage. Observe all the precautions given above under "Safety Precautions."

If possible, open cyanide containers in the areas in which the cyanide is to be used. Remove the cover from the container and remove the cyanide with a metal scoop or dump the cyanide from the container as required. Replace the cover on the container if the drum still contains cyanide. Store appropriately. Immediately pick up any spillage.

Drum Disposal

Sodium cyanide drums are non-returnable, as it is against DOT regulations to reuse the drum, except when approved for disposal of waste materials. Empty drums should be flushed with large volumes of water,

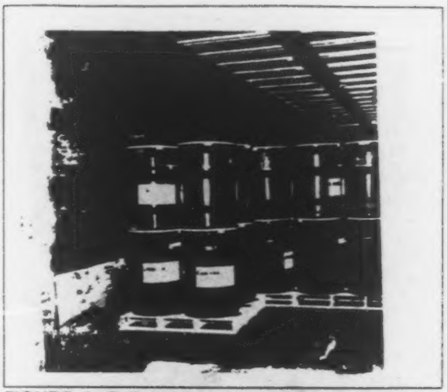

FIGURE 6. Palletized 200-lb drums being loaded into a truck.

FIGURE 7. Pallet loaded with 18 100-lb strapped drums.

FIGURE 8. Partially loaded box car.

FIGURE 9. Detail of ring closure of drum.

then drained. This flush and drain cycle should be repeated three times. Rinse water should be collected, treated and disposed of according to local regulations.[b] After cleaning, drum labels should be removed or obliterated to confirm cleaning, and the drum punctured in several locations or destroyed to prevent reuse.

FLO-BIN® Delivery

Sodium cyanide is shipped in returnable FLO-BIN® containers to customers either by flat car (up to 44 bins per car) or truck. In trailers, the new style bins are shipped two-abreast. Road weight limitations restrict the truck load to 12 bins. The advantages of FLO-BIN® deliveries are:

ECONOMICS: Customers using about 500 000 pounds (or 200 000 kg) per year of NaCN can effect direct price savings vs. other smaller packages.

HANDLING: Significant on-plant labor savings and reduced injury risk result from handling and opening 1 bin vs. 15 drums. Bins are readily handled with fork lift trucks.

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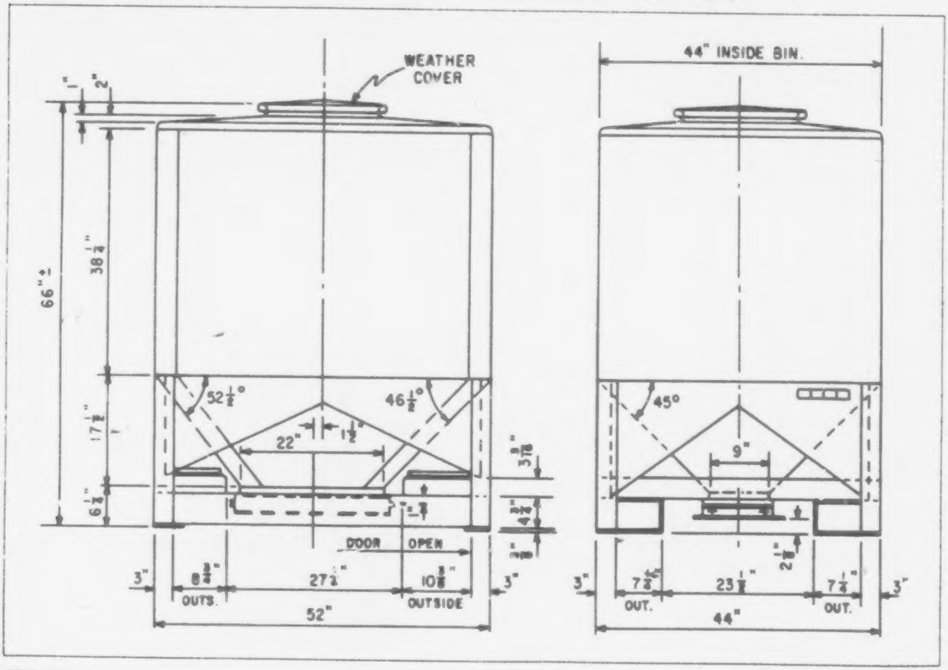
[b] See WASTE DISPOSAL on page 18.

FIGURE 10. Diagram of New FLO-BIN[f] Container for Sodium Cyanide



WEATHER COVER
1"
2"
66" ±
38 1/4"
17 1/2"
6 1/4"
52 1/2°
46 1/2°
22"
1 1/2"
3 3/16"
4 3/16"
DOOR OPEN
3"
8 3/4"
27 1/2"
10 3/8"
3"
OUTS.
OUTSIDE
52"
44" INSIDE BIN
45°
9"
3"
7 3/4"
23 1/2"
7 1/4"
3"
OUT.
OUT.
44"

---

[f] Reg. U.S. Pat. & Tm. Off., Fabricated Metals, Inc., San Leandro CA

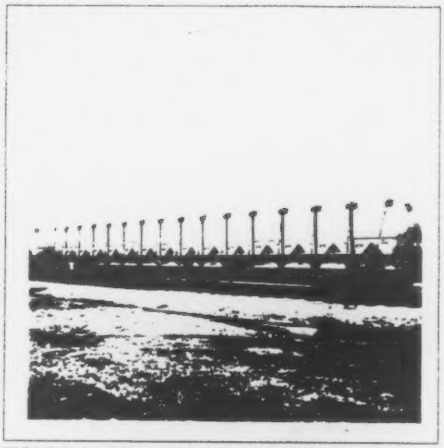


FIGURE 11. **Bins loaded on a flat car. Up to 44 bins can be carried depending on the size of the car.**

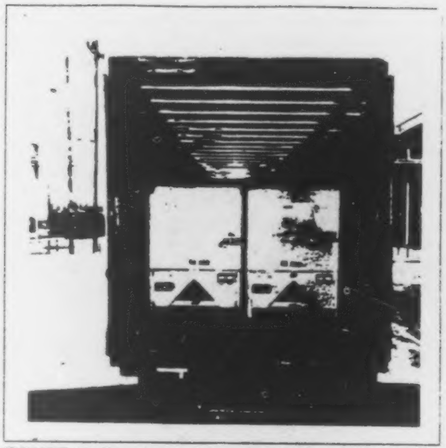


FIGURE 12. **Bins loaded two-abreast in a truck. A plywood wall is erected and braced to prevent movement during transportation.**

DISPOSAL: With returnable bins, the customer does not have to clean or dispose containers that have contained a Class B Poison.

FLO-BIN® bins of sodium cyanide are moved from railroad flat cars or trucks to a warehouse, or where local regulations permit, to an outside area designated for cyanide storage. The bins may be stacked two high when loaded, three high when empty.

The bins have a 9 in × 22 in slide-gate with an end-lock closure and a gasket seal at the bottom. The top and manhole cover are domed to provide water runoff.

The bin is moved by fork lift truck to the unloading site

FIGURE 13. **Bins are moved by fork lift truck. They can be stacked two high when loaded.**

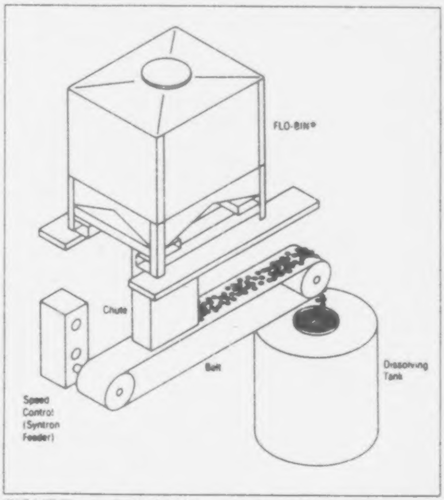


FIGURE 14. **FLO-BIN® on a Controlled Feed Dispenser**

and positioned for unloading. To unload, first pull out the locking pins and break the seal. Then, using the special wrench provided, turn the cam locks dropping the slide gate. The slide gate can now be moved. Normally the cyanide briquettes will then flow out. However, sodium cyanide is hygroscopic and may compact or bridge in spite of the fact that the bin has been tightly sealed prior to shipment. To start flow it may be necessary to rod into the opening to break the bridge.

After emptying the bin, replace the slide gate to its fully closed position. Turn both cam locks to their closed position. Replace locking pins in cams in holes provided. Be sure barrel cover is on and secured.

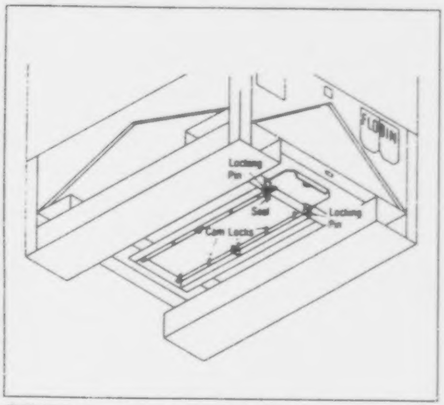


FIGURE 15a. **New Style FLO-BIN®**
Break the seal and pull out the locking pins.

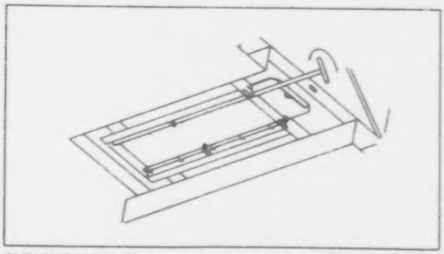


FIGURE 15b. **Using the special wrench provided, turn the cam locks, dropping the gate.**

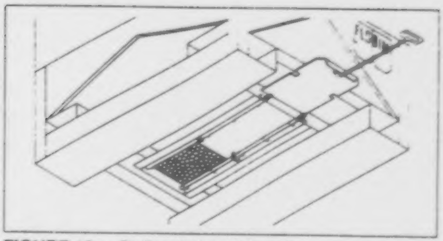


FIGURE 15c. **Pull out the slide gate.**

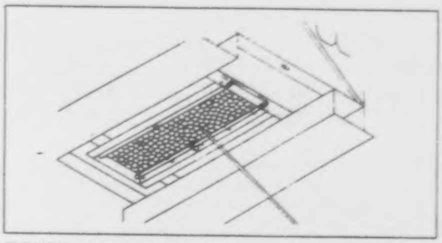


FIGURE 15d. **Normally, the cyanide briquettes will flow out. However, sodium cyanide is hygroscopic and may compact or bridge in spite of the fact that the bin has been tightly sealed prior to shipment. In order to start flow in this case, it may be necessary to rod into the opening or strike the cone area with a two-by-four to break the bridge.**

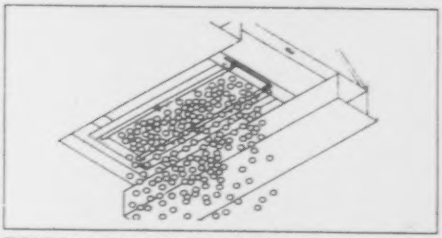


FIGURE 15e. **The sodium cyanide briquettes flow out.**

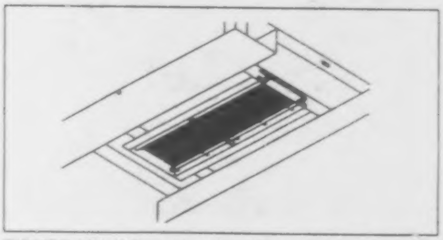


FIGURE 15f. **When the flow has stopped, inspect the bin from both the bottom and the top to make sure that the bin is empty.**

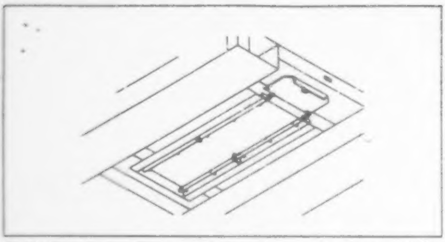


FIGURE 15g. Replace the slide gate to its fully closed position.

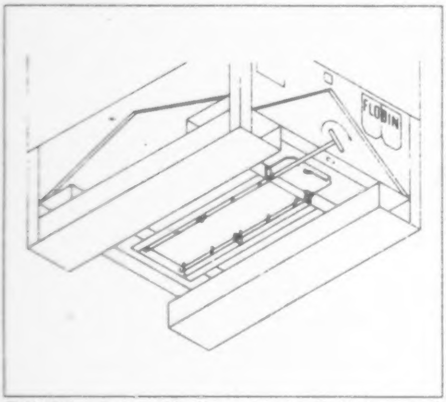


FIGURE 15h. Turn both cam locks to their closed position.

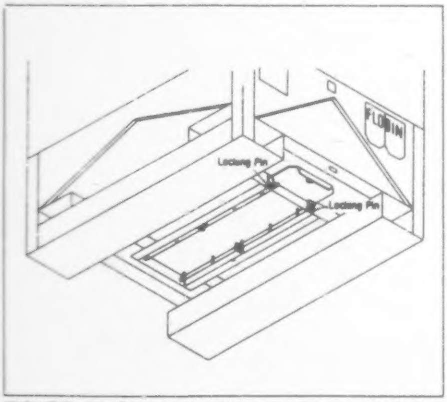


FIGURE 15i. Replace locking pins in cams in holes provided. Be sure top cover is on and secured.

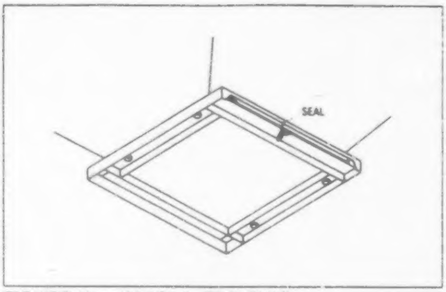


FIGURE 16a. Old Style FLO-BIN®
To open, break seal, remove bolt at seal, loosen the four side bolts.

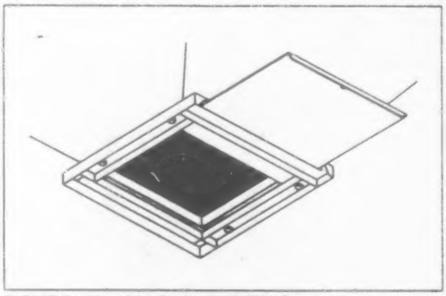


FIGURE 16b. Old Style FLO-BIN®
Pull out side gate. When empty, push in slide gate, replace bolt, and tighten side bolts.

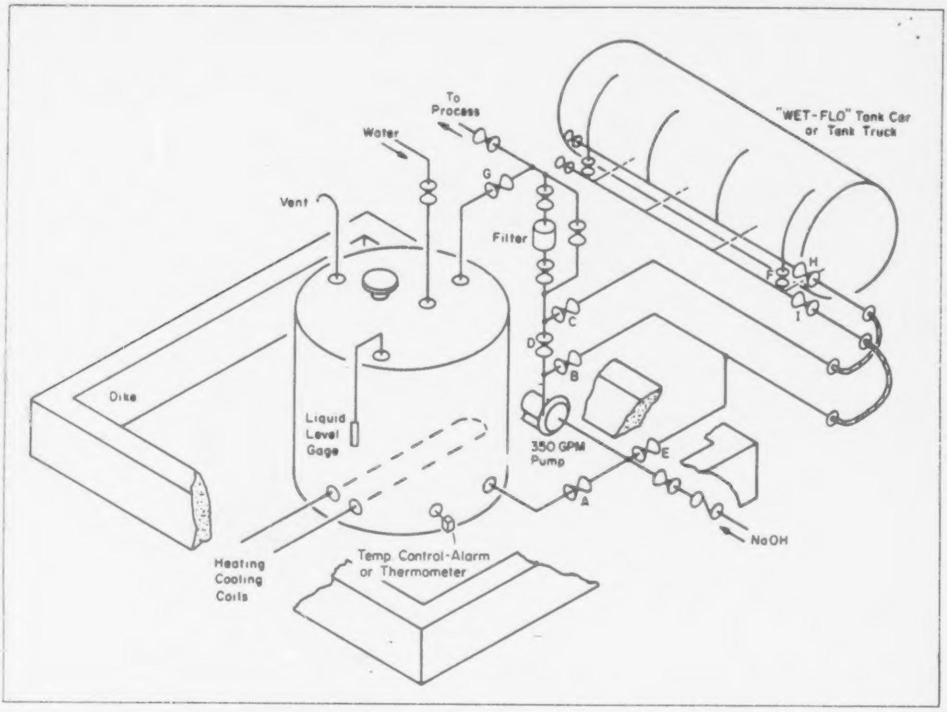
FLO-BIN® CUSTOMER SHIPPING RESPONSIBILITY

When returning bins, the customer becomes the shipper and bears the responsibility for seeing that all safety precautions are carried out. DOT regulation 49 C.F.R., paragraph 173.29 requires that when a returnable container is offered for transportation, it must meet the same standards as when the container previously held a greater quantity of a hazardous material. Returning bins do not have to be cleaned internally.

If returning bins by rail, place bins so that the slide gate opening is facing the center of the car. Secure bins in container car with equipment provided. Reverse placards (4) on car to indicate empty. DO NOT remove or deface product label on bin. If the slide gate is not properly closed or locked, sodium cyanide adhering to the walls of the bin can fall off and create a serious poison hazard in the truck or rail car.

Storage and use areas should be designated so that accidental spillage can be contained and disposed safely.

FIGURE 17. Unloading and storage system for receiving "Wet-Flo" tank cars and tank trucks


To Process
Water
Vent
G
Filter
"WET-FLO" Tank Car or Tank Truck
H
F
I
C
D
B
Dike
Liquid Level Gage
350 GPM Pump
E
A
NaOH
Heating Cooling Coils
Temp Control-Alarm or Thermometer

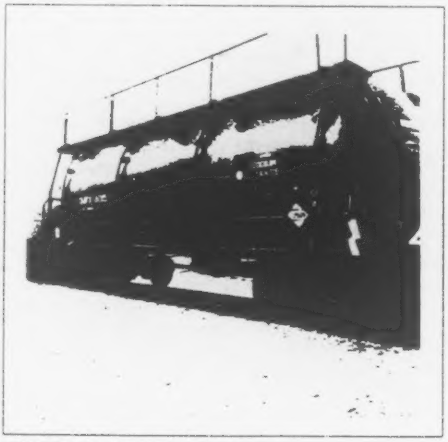


FIGURE 18. "Wet-Flo" tank car

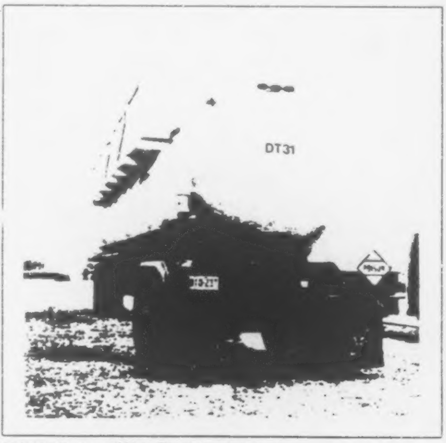
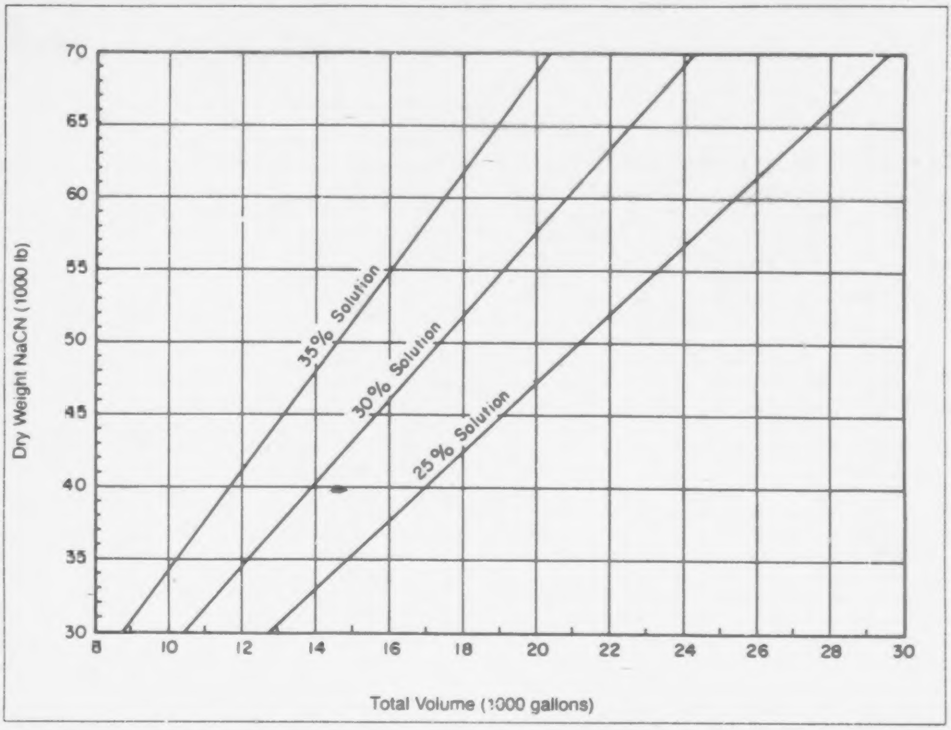


FIGURE 19. "Wet-Flo" tank truck

FIGURE 20. Solution Volume Curves—Gallons of Solution from Dry Weight @ 35 C (95 F)



"Wet-Flo" Tank Cars and Tank Trucks

When dissolving the NaCN in the "Wet-Flow" system, position the tank car or tank truck so that the hose connection can be made between the pipe headers and the storage tank piping and pump.

Meter into the storage tank the amount of water needed to make the desired concentration of sodium cyanide solution. Dissolving sodium cyanide is endothermic (absorbs heat), so the water can be preheated to 100 F (38 C) to speed the dissolving. See "Chemical Reactions," pages 4-5. However sodium cyanide solution in storage should be kept below 80 F (27 C) to prevent decomposition (See Fig. 4). Decomposition rates become excessive at temperatures above 120-125 F (49-52 C) with sodium formate and ammonia being formed. Since this reaction is exothermic, provision must be made to remove the heat generated or, once started, the reaction may get out of control releasing large quantities of ammonia (See Temperature Indicators, Insulation, Heating and Cooling under EQUIPMENT on page 18.)

Unloading Procedure (See Figure 17)

Open valves A, B, C, G, H, I and the filter valves. Start the pump, then open the valve to the caustic supply. Check the system for leaks. Add sufficient caustic to give a final concentration of above 0.5% NaOH in the sodium cyanide solution. Pump the water continuously through the tank car or truck and storage tank for three hours. Then check the concentration by chemical analysis or specific gravity every half hour until it remains constant for at least two check analyses. This indicates that all sodium cyanide is dissolved. Do not pump out solution until it is completely dissolved, otherwise the lines may plug with briquettes and saturated solution. Stop the pump and close valves A, B, and C. Open valves E and D and pump the NaCN solution from the tank car or truck into the storage tank. Finally, open valve F to drain the top header.

EQUIPMENT

MATERIALS OF CONSTRUCTION

Carbon steel equipment is satisfactory for sodium cyanide solutions where velocities are not over 4-5 ft/sec (1.2-1.5 m/sec). At higher velocity, 304 stainless steel is recommended because an erosion-corrosion effect occurs on steel. Welded, not threaded, steel piping should be used even at very low velocities. For pumps, valves, instruments, etc., 304 stainless is recommended. Gaskets of compressed white asbestos, with Buna S bonded filler are recommended for sodium cyanide solutions. Red rubber gaskets are satisfactory at ambient temperatures.

SOLUTION STORAGE TANK

For Wet-Flo systems, sodium cyanide solution is stored in a tank, typically fabricated from $^{5}/_{16}$-in carbon steel plate. Top openings are recommended for a 6 to 8-in (15.2 to 20.3-cm) pipe vent, a 3 to 4-in (7.6 to 10.2-cm) fill and circulating line, level indicator, high-level alarm, provision for water and caustic additions and manway. A top 4-in nozzle for a physical break in the water line will prevent back-flow. Bottom openings must also be provided for a 4-in (10.2-cm) circulating line, temperature control-alarm or thermometer and optional heating/cooling coils. The size of the storage tank depends upon shipment size and concentration of sodium cyanide solution required. For example, 65 000 pounds (29 500 kilograms) of sodium cyanide makes 19 000 gallons (72 000 liters) of 35% solution. A vertical tank 16 ft (4.9 m) in diameter by 20 ft (6.1 m) high has a 30 000 gallon (113 600 liter) capacity which is sufficient to allow some outage and/or solution inventory. The tank may be lined with neoprene to prevent build-up of iron content, if this is critical to the process. All pipe nozzles should be schedule 80 pipe.

If the storage tank is located inside a building, all tank openings must be sealed and the tank vent routed outside the building to a safe location. This will prevent the accumulation of dangerous levels of hydrogen cyanide inside the building. (See "Caustic Addition" below.)

PUMP

A stainless steel pump with a 4-in (10.2-cm) suction and a 3-in (7.6-cm) discharge is needed. It should be capable of delivering 350 gallons (1325 liters) per minute at an 80-ft (24.4-m) head. Small pumps will not provide sufficient agitation for tank car cyanide dissolving. Totally enclosed fan-cooled motors are generally used in outside installations.

WATER METER & SUPPLY

A 3-in (7.6-cm) water meter with preset totalizer and an automatic cut-off should be installed in the storage tank water addition line. There should be a physical disconnection in the water supply line to prevent cyanide from backing up into the water system.

PIPE AND HOSES

Carbon steel is satisfactory where velocities are not over 4-5 ft/sec (1.2-1.5 m/sec.). At higher velocity an erosion-corrosion effect occurs on steel, and 304 stainless steel is recommended. Welded, not threaded, pipe should be used. For gaskets, see "Materials of Construction" above. Wet-Flo circulation piping of 4-in (10.2 cm) is recommended with all valves, pumps, etc., located inside the dike and minimum flanges outside the dike. Tank car hoses should be wire-reinforced rubber, with end connections constructed as an integral part of the hose. Banded slip-on end connections are not recommended. Hose pressure rating should be 225 psi minimum with burst pressure (including end connections) at least twice the rated pressure. Circulation piping system, including hoses, should be inspected before each use to protect against failure and a major spill. Hoses should be long enough to permit hook-up regardless of the direction the car comes into the siding. Tank car connections are located on each end, but only on one side of the car.

DRAINAGE CONTROL

The storage tank should be diked and have a sealed concrete bottom. No dike drain should be installed since it might leak or be left open. The unloading area should be curbed and drainage control provided which will prevent spilled cyanide solution from draining into public water courses. (See "Pipe and Hoses" above.) Specific spill control requirements depend on surroundings and local regulations. Impounded sodium cyanide can be chemically destroyed by alkali chlorination or treatment with KASTONE® peroxygen compound* and formaldehyde* (see WASTE DISPOSAL).

FILTER

To obtain a clear solution, a filter should be used. It should be so located that it filters the solution between the tank car and the storage tank, and also, between the storage tank and process.

LEVEL INDICATOR AND LEVEL ALARM

A manometer-type liquid level indicator is preferred over a float-type instrument as it is easier to read and can be installed at a convenient location. It is recommended that a high-level alarm system, equipped to shut off the pump, be installed to prevent overflowing the storage tank.

*Also a Du Pont product

TEMPERATURE INDICATORS, INSULATION, HEATING AND COOLING

Since sodium cyanide solution should be stored above the crystallization point (See Fig. 5), but below 80°F (27°C) where decomposition becomes significant (See Fig. 4), a temperature control system may be needed. Tank insulation can be fiberglass with a sheet aluminum cover if climate and solution concentration warrant. Temperature probes mounted on the sides of the tank at several locations may be needed. Low pressure steam should be used to avoid localized overheating. The same coils can be used for circulating cold water (or other coolant) when necessary.

CAUTION: Read the CHEMICAL REACTION section carefully and note the dangers at high temperatures.

CAUSTIC ADDITION

To minimize highly toxic HCN formation and prevent color formation in the stored sodium cyanide solution, sufficient caustic (sodium hydroxide) is added to give a pH 12. Caustic addition to provide a 0.5% solution (50 lb NaOH per 1,000 gallons water) is usually sufficient. A 50% caustic solution can be used during the summer, but a 25% solution is recommended for winter to avoid freezing. Additions can be made directly to the tank or through a connection on the suction side of the pump while the water is circulating. In any case, caustic should be added *before* circulation to dissolve sodium cyanide is started. Where process chemistry prevents caustic addition, HCN formation must be controlled by other means as discussed in "Chemical Reactions", p. 4-5.

FLO-BIN® CONTAINER HANDLING

Bins can be readily handled by a fork lift truck with 3 600 pounds (1600 kg) capacity. They can be stacked two high when loaded and three high when empty. Trailer trucks, while limited to twelve loaded bins by weight regulations, can carry up to twenty empty bins.

WASTE DISPOSAL

The entire process in which the waste is generated should be reviewed for possible reclamation and reuse of sodium cyanide as well as its disposal. If reclamation is not feasible, ion exchange, reverse osmosis and dialysis may be useful, but destruction is usually easier and more economical.

Chlorination

CAUTION: CONCENTRATED HYPOCHLORITE SHOULD NOT BE MIXED WITH CONCENTRATED CYANIDE SOLUTIONS OR SOLID CYANIDE BECAUSE HIGHLY TOXIC CYANOGEN CHLORIDE GAS WILL BE RELEASED.

Chlorination of sodium cyanide waste solutions can be accomplished by treatment with highly diluted solutions of sodium hypochlorite, calcium hypochlorite or by generating hypochlorite from NaOH and Cl_2 gas. The choice of hypochlorite source is an economic and safety decision.

Hypochlorite reacts with cyanide ions (CN^-) to produce highly toxic cyanogen chloride which, at pH 10-11, hydrolyses promptly to form cyanate ions (CNO^-). Since cyanogen chloride is a poisonous gas with little water solubility, the treatment process must be designed and operated to prevent cyanogen chloride fumes. Fumes are controlled by limiting the cyanide concentration to a few thousand parts per million.

Further chlorination to destroy cyanate, sometimes referred to as "complete" chlorination, can be accomplished with additional chlorine. After reaction at pH 10.5 for 10 minutes or more, the pH must be reduced to 7.5-9, preferably 8-8.5, and maintained at that pH until the reaction is complete. Completion of both reactions requires at least 2 hours and can use 8 or more parts of Cl_2 per part of CN^- (vs. about 3 parts of Cl_2 for oxidation to CNO^-) while producing CO_2 and N_2 as reaction products. Chlorination is effective for cyanide destruction and can be automated for continuous systems. However, other waste stream components are often chlorinated, which increases chlorine consumption and may produce undesirable by-products in the effluent.

Peroxide Oxidation

CAUTION: CONCENTRATED KASTONE® PEROXYGEN COMPOUND OR HYDROGEN PEROXIDE SHOULD NOT BE MIXED WITH CONCENTRATED CYANIDE SOLUTIONS OR SOLID SODIUM CYANIDE BECAUSE HIGHLY TOXIC HCN OR AMMONIA GAS COULD BE RELEASED. ALSO, HIGH HEAT AND OXYGEN GAS RELEASE MAY CAUSE FOAMING OR ERUPTION AND SPLASH WORKERS. DILUTION PREVENTS THESE PROBLEMS.

Du Pont KASTONE® Peroxygen compound contains hydrogen peroxide and special stabilizers and additives for use in treating cyanide wastes. Depending on the composition of the waste, additions of formaldehyde may also be desirable. The waste liquor is adjusted to pH 11 (10.5-11.5), formaldehyde added if needed, and KASTONE® mixed with the solution. The solution must be agitated mechanically or with air. The reaction rate is dependent on temperature. Dilute wastes can be warmed to 100-130 F, (38-54 C) but temperature elevation is usually less economical than adding 10-20%

excess KASTONE® to shorten reaction time (which is normally about ½-1 hour at ambient temperature). Dilution and controlled addition rate may be needed when treating more concentrated wastes.

Advantages of the KASTONE® process vs. the chlorination process include:

- The reagents are far less corrosive.
- Investment is usually substantially lower.
- Operating costs are frequently lower.
- Cyanogen chloride and chlorinated by-products are not produced.
- More concentrated cyanide wastes can be treated safely.
- The hazards of handling chlorine are avoided.

By-products from KASTONE® treatment are cyanate, ammonia, and glycolic acid amide. Cyanate does not revert to cyanide in surface waters or sewage treatment systems according to a U.S. Public Health Service study. Both the cyanate and glycolic acid amide are biodegradable. The cyanate can be readily hydrolyzed in acid solutions to ammonia.

Hydrolysis

Hydrolysis is sometimes a practical treatment for strong sodium cyanide solutions. Simply boiling a 10% sodium cyanide solution for about 8 hours should reduce the cyanide content to the parts per million range where chemical oxidation can be used more effectively. Provisions should be made, of course, to accommodate the ammonia that will be generated. The most effective and widely used chemical methods to destroy cyanide are oxidizing it to cyanate (CNO^-) with hypochlorite or hydrogen peroxide. Both methods are effective for oxidizing free cyanide, ions, or loosely bonded complexes.

Metal Complexes

Strongly bonded metal cyanides, especially iron cyanides (ferro- and ferricyanide), are apt to be found in cyanide waste streams. These will not be detected by simple analytical procedures, such as titration with silver nitrate, that are normally used for measuring cyanide concentration. However, they will be included in the "total cyanide" analyses using acid distillation procedures. These complexes are not effectively destroyed by the commonly used waste processes. If regulations require removal of these generally stable complexes of low toxicity, other treatment methods such as precipitation to produce a solid waste may be required.

HANDLING SPILLS

Sodium cyanide spills should be cleaned up promptly to minimize exposure to people and the environment. Shovel and sweep spilled material into a drum or suitable container. Keep spilled material dry. If raining, covering the spill will reduce the solution of sodium cyanide and reduce run-off. Decontamination of an area and destruction of cyanide for disposal can be accomplished with dilute hypochlorite solution. A small amount of caustic (5 lb/100 gallons water) will keep the pH of a sodium cyanide solution around 12 and minimize hydrogen cyanide formation. A little caustic solution can be used in a wet drum or puddle until disposal or decontamination is completed.

SOURCES OF EQUIPM[illegible]

Below is a partial list of suppliers of equipment for sodium cyanide service. This list is intended only to suggest sources of supply. It is not to be considered as complete or implying that there are no other manufacturers supplying suitable equipment.

Pumps

The Duriron Co., Inc.
N. Findlay and Thomas Sts.
Dayton OH 45401

Lawrence Pumps Inc.
371 Market St.
Lawrence MA 01843

Tabor Pump Company
P.O. Box 1071
Elkhart IN 46514

Valves

Aloyco, Inc.
1400 W. Elizabeth Avenue
Linden NJ 07036

The Duriron Co., Inc.
N. Findlay and Thomas Sts.
Dayton OH 45401

The William Powell Co.
2503 Spring Grove Ave.
Cincinnati OH 45214

Steel Storage Tanks

Birmingham Tank Co.
621 Fourth Ave.
Birmingham AL 35233

Buffalo Tank Division
Bethlehem Steel Corp.
South Avenue, P.O. Box F
Dunellen NJ 08812

Chicago Bridge & Iron Co.
800 Jorie Blvd.
Oak Brook IL 60521

Graver Tank & Mfg. Co.
4809 Tod Ave.
East Chicago IN 46312

Pittsburgh-Des Moines Steel Co.
3401 Neville Island
Pittsburgh PA 15225

TEMPERATURE CONTROL

Self-acting temperature controller:
  Taylor Instrument Process Control Div.,
  Sybron Corporation
  95 Ames St.
  Rochester NY 14601

  Robertshaw Controls Co.
  P. O. Box 400
  Knoxville TN 37901

METERS

Manometer:
  Meriam Instrument
  Div. of Scott & Fetzer Co.
  10978 Madison Ave.
  Cleveland OH 44102

  King Engineering Co.
  Box 1228
  Ann Arbor MI 48106

Indicating & recording gauges:
  The Foxboro Co.
  86 Neponset Ave.
  Foxboro MA 02035

  Simonds Precision
  Industrial Instruments Div.
  Rockingham Rd.
  Bellows Falls VT 05101

HOSES

B. F. Goodrich Co.
500 South Main St.
Akron OH 44318

Gates Rubber
999 S. Broadway St.
Denver CO 80217

Goodyear Industrial Products Co.
16 Murray St.
New York NY 10007

Hewitt-Robins, Inc.
Division of Litton Industries
666 Glenbrook Rd.
Stamford CT 06906

Raybestos-Manhattan, Inc.
100 Oakview Drive
Turnbull CT 06611

Resistoflex Corp.
Woodland Rd.
Roseland NJ 07068

Gaskets

Garlock Inc.
1250 Midtown Tower
Rochester NY 14604

Johns-Manville
Greenwood Plaza
Denver CO 80217

FILTERS

AMF Cuno Div., AMF Corp.
400 Research Parkway
Meridan CT 06450

Commercial Filters Div.
The Carborundum Co.
St. Road 32 West
Lebanon IN 46052

Filterite Corp.
1993-95 Greenspring Drive
Timonium MD 21093

Pall Trinity Micro Corp.
Cortland NY 13045

INSTRUMENTS

Moore Products Co.
Spring House PA 19477

Fischer & Porter Co.
County Line Rd.
Warminster PA 18974

Brooks Instrument Div.
Emerson Electric Co.
121 Cedar Lane
Teaneck NJ 07666

Wallace & Tiernan
25 Main St.
Belleville NJ 07109

E. I. du Pont de Nemours & Co. (Inc.)
Wilmington, Delaware 19898

U.S. Sales and Services

For placing orders or requesting additional product information, please use our convenient 24-hour toll-free telephone number. If you prefer, you can write to us.

By Phone

Toll free in continental U.S. (except Delaware)
(800) 441-9442

In Delaware
(302) 774-2099

By Mail

E. I. du Pont de Nemours & Co. (Inc.)
Chemicals and Pigments Dept.
Customer Service Center
Wilmington, DE 19898

International Sales Offices

CANADA
Du Pont Canada Inc.
Box 660
Montreal S, P.Q. H3C 2V1
(514) 861-3861

Du Pont Canada Inc.
P.O. Box 2300
Streetsville Postal Station
Mississauga, Ontario L5M 2J4
(416) 821-5570

LATIN AMERICA
E. I. du Pont de Nemours & Co. (Inc.)
Chemicals and Pigments Dept.
Latin America Sales Office
Brandywine Building
Wilmington, DE 19898
(302) 774-3403

EUROPE
Du Pont de Nemours International S.A.
P.O. Box
CH-1211
Geneva 24, Switzerland
022-378111

ASIA-PACIFIC
Du Pont Far East, Inc.
Kowa Building No. 2
11-39 Akasaka 1-chome
Minato-ku
Tokyo 107, Japan
585-5511

Du Pont Far East, Inc.
Maxwell Road
P.O. Box 3140
Singapore 9051
273-2244

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E-70679 7/85 (5M) Printed in U.S.A.

DU PONT

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

NAME
Sodium Cyanide

GRADE
Cyanobrik*; Cyanogran*;
Compounders Grade

SYNONYMS
Cyanide of Sodium; Prussiate of Soda

CAS NAME Sodium Cyanide

I.D. NOS./CODES
NIOSH Registry No. VZ7525000

MANUFACTURER/DISTRIBUTOR
E. I. du Pont de Nemours & Co. (Inc.)

ADDRESS Wilmington, DE 19898

CHEMICAL FAMILY
Alkali Metal Cyanide

FORMULA $NaCN$

CAS REGISTRY NO. 143-33-9

PRODUCT INFORMATION PHONE
(800) 441-9442

MEDICAL EMERGENCY PHONE
(800) 441-3637

TRANSPORTATION EMERGENCY PHONE
Du Pont Cyanide HOTLINE
(For emergencies only)
(901) 357-1546
CHEMTREC (800) 424-9300

PHYSICAL DATA

BOILING POINT, 760 mmHg
1496°C (2725°F)

SPECIFIC GRAVITY 1.6

VAPOR DENSITY
Not volatile

pH INFORMATION 11.3 to 11.7
(Typical for 5 to 25% solutions with no pH adjustment)

FORM Solid

MELTING POINT
564°C (1047°F)

VAPOR PRESSURE Negligible

SOLUBILITY IN H_2O
37% at 20°C (68°F)

EVAPORATION RATE (BUTYL ACETATE=1)
Not applicable

APPEARANCE Granular or Briquettes

*Reg. U.S. Pat. & Tm. Off., Du Pont Company Cyanobrik(R) and Cyanogran(R) Sodium Cyanide are made only by Du Pont.

E-90005 Date: 1/87

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

COLOR White

ODOR None (but can have slight ammoni: and/or HCN odor if damp)

HAZARDOUS COMPONENTS

MATERIAL(S)	APPROXIMATE %
Sodium Cyanide (CAS No. 143-33-9)	100

HAZARDOUS REACTIVITY

INSTABILITY
Very stable when dry.

INCOMPATIBILITY
Large amounts of highly toxic, flammable hydrogen cyanide (HCN) gas will be evolved from contact with acids. Reacts violently with strong oxidizing agents. Water or weak alkaline solution can produce dangerous amounts of HCN in confined areas.

DECOMPOSITION
Moisture will cause slow decomposition, releasing poisonous HCN and ammonia gas.

POLYMERIZATION
Will not occur.

FIRE AND EXPLOSION DATA

FLASH POINT Will not burn.

AUTOIGNITION TEMPERATURE
Not applicable.

FLAMMABLE LIMITS IN AIR, % BY VOL.
LOWER Not applicable.
UPPER Not applicable.

FIRE AND EXPLOSION HAZARDS
Will not burn. Sodium cyanide will not be destroyed in an ordinary fire involving combustible materials such as paper or wood.

EXTINGUISHING MEDIA
Water on fires near sodium cyanide, but minimize amount of water if containers are opened or burned (see "Incompatibility", above) DO NOT use carbon dioxide (CO_2) which reacts with sodium cyanide to produce hydrogen cyanide if moisture is present.

SPECIAL FIRE FIGHTING INSTRUCTIONS
Sodium cyanide dissolves readily in water, therefore cyanide solution runoff may occur if containers are opened or burned. Runoff should be contained to avoid environmental or safety problems. Contained cyanide solution can be detoxified with hypochlorite.

HEALTH HAZARD INFORMATION

PRINCIPAL HEALTH HAZARDS (Including Significant Routes, Effects, Symptoms of Over-Exposure, and Medical Conditions Aggravated by Exposure)

May be fatal if inhaled, swallowed, or absorbed through skin. Contact with acids or weak alkalis liberates poisonous gas. Causes eye burns and may irritate skin.

Oral LD50: 6 mg/kg in rats

Toxic effects described in animals from exposure include asphyxia, dyspnea, ataxia, tremors, coma, and lethality by disrupting oxidative metabolism. Tests in bacterial and mammalian cell cultures demonstrate no mutagenic activity. Tests in some animals indicate that the compound mav affect the fetus, that is, it may be a developmental toxin.

Human health effect of overexposure may initially include: skin irritation with discomfort or rash, eye irritation or burns with discomfort, tearing, or blurring of vision, and possible permanent eye damage; and nonspecific discomfort such as nausea, headache, dizziness, vomiting, and weakness. Higher exposures may lead to these effects: rapid respiration; lowered blood pressure; unconsciousness; convulsions; and fatality. Evidence suggests that significant skin permeation can occur. Individuals with preexisting diseases of the central nervous system may have increased susceptibility to the toxicity of excessive exposures.

CARCINOGENICITY

Not listed as a carcinogen by IARC, NTP, OSHA, ACGIH, or Du Pont.

EXPOSURE LIMITS (PEL (OSHA), TLV (ACGIH), AEL (DU PONT), ETC.)

The OSHA 8-hour Time Weighted Average (TWA) and ACGIH TLV$^{(R)}$-TWA are 5 mg/m^3, as CN. Both carry a "skin" notation indicating that cyanide may penetrate the skin (especially if the skin is broken). Control of vapor, dust, and mist inhalation alone may not be sufficient to prevent absorption of an excessive dose.

SAFETY PRECAUTIONS

Do not breathe dust, mist, or HCN gas. Do not get in eyes. Avoid contact with skin and clothing. Do not carry foodstuffs, beverages, or tobacco where contamination with cyanide is possible. Wash thoroughly after handling. Wash contaminated clothing before reuse.

FIRST AID AND MEDICAL TREATMENT

Actions to be taken in case of cyanide exposure should be planned and practiced before beginning work with cyanides. In most cases, cyanide poisoning causes a deceptively healthy pink to red skin color; however, if a physical injury or lack of oxygen is involved, the skin color may be bluish.

Treatment for cyanide poisoning can be provided in two ways, "First Aid" and "Medical Treatment". Both require immediate action to prevent further harm or death. First aid using amyl nitrite and oxygen is generally given by a layman before medical help arrives.

Medical treatment involves intravenous injections and must be administered by qualified medical personnel. Even if a doctor or nurse is present, the need for fast treatmen dictates using first aid treatment with amyl nitrite and oxygen while medical treatment materials for intravenous injection are being prepared. Experience shows that first aid given promptly is usually the only treatment needed.

Medical treatment is given if the victim does not respond to first aid. It provides a larger quantity of antidote including sodium thiosulfate to chemically destroy cyanide in the body. However, even under optimum conditions, amyl nitrite can be administered faster and should be used even if medical treatment follows. Do not overreact. Fast treatment is needed, but a conscious person usually does not need treatment beyond oxygen. Amyl nitrite and medical treatment kits for cyanide poisoning are available, with doctor's prescription, from pharmacies.

A. First Aid - Directions for Giving Amyl Nitrite Antidote and Oxygen

1. Conscious:- For inhalation and/or absorption if the victim is alert, oxygen may be all that is needed. But if he is not fully conscious or shows signs of poisoning, follow paragraph A-2 below. For swallowing, see below paragraph C, "First Aid - Swallowing Cyanide".

2. Unconscious But Breathing: Break up amyl nitrite ampule in a cloth and hold lightly under the victim's nose for 15 seconds, then take away for 15 seconds. Repeat 5-6 times. If necessary, use a fresh ampule every 3 minutes until the victim regains consciousness (usually 1-4 ampules). Give oxygen to aid recovery. Where more severe poisoning has occurred, consider holding the amyl nitrite under the nose continuously for the first ampule or more.

3. Not Breathing:
   a. Give artificial respiration, preferably with an oxygen resuscitator. Give amyl nitrite antidote by placing a broken ampule inside the resuscitator face piece, being careful that the ampule does not enter the victim's mouth and cause choking.
   b. If using manual artificial respiration, give amyl nitrite antidote as in paragraph A-2 above except keep the first amyl nitrite ampule under the nose with replacement every 3 minutes.

4. Amyl Nitrite Notes:
   a. Amyl nitrite is highly volatile and flammable; do not smoke or use around source of ignition.
   b. If treating poison victim in a windy or drafty area, provide something - a rag, shirt, wall, drum, cupped hand, etc. - to prevent the amyl nitrite vapors from being blown away. Keep the ampule upwind from the nose. The objective is to get amyl nitrite into the victim's lungs.
   c. Rescuers should avoid amyl nitrite inhalation so they won't become dizzy and lose competence.
   d. Lay the victim down for treatment to maintain a good blood supply to the victim's head. Since amyl nitrite dilates the blood vessels and lowers blood pressure, lying down will help prevent unconsciousness.

e. Do not overuse; excessive use might put the victim in shock. This has not occurred in practice at Du Pont plants and we are not aware of any death or serious aftereffects from treatment with amyl nitrite. (See paragraph E, "Medical Treatment".)

B. **First Aid - Inhalation of Cyanide** - Carry the victim to fresh air. Lay victim down. Administer amyl nitrite antidote and oxygen (Paragraph A). Check for and remove contaminated clothing. Keep patient quiet and warm. Call a physician.

C. **First Aid - Swallowing Cyanide**

1. Conscious: Immediately give patient one pint of 1% sodium thiosulfate solution (or plain water) by mouth and induce vomiting with finger in throat. Repeat until vomit fluid is clear. Never give anything by mouth to an unconscious person. Call a physician.

2. Unconscious: Follow first aid procedure as in paragraphs A-2 and A-3 (and/or medical treatment in paragraph E) and call a physician. If the victim revives, then proceed with paragraph C-1.

D. **First Aid - Skin or Eye Contact (Skin Absorption)**

1. Eye Contact: Immediately flush eyes with plenty of water, remove contaminated clothing, and keep victim quiet and warm. Call a physician.

2. Skin Contact: Wash skin to remove the cyanide while removing all contaminated clothing, including shoes. Do not delay. Skin absorption can occur from cyanide dust, solutions, or HCN vapor. Absorption is slower than inhalation, usually measured in minutes compared to seconds for inhalation.

   Follow First Aid procedures in Paragraph A if treatment is needed, but even severe skin contact usually will not require treatment if 1) no inhalation or swallowing has occurred and 2) the cyanide is promptly washed from the skin and contaminated clothing and shoes are removed. If skin contact is prolonged, HCN poisoning may occur with nausea, unconsciousness, and then death possible if the source of cyanide intake is not removed and treatment provided. Even after washing the skin, the victim should be watched for at least 1 to 2 hours because absorbed cyanide can continue to work into the bloodstream. Wash clothing before reuse and destroy contaminated shoes.

E. **Medical Treatment**

Medical treatment is normally provided by a physician, but might be provided by a professionally trained "qualified medical person" where a need exists and where state and local laws permit.

While preparing for sodium nitrite and sodium thiosulfate injections, use amyl nitrite and oxygen as outlined in paragraph A. When ready and if the victim is not responding to first aid, first inject the solution of sodium nitrite (10 mL of a 3% solution) intravenously at the rate of 2.5 mL/minute, then immediately inject the sodium thiosulfate (50 mL of a 25% solution) at the same rate, taking care to avoid extravasation.

This is a fairly lengthy treatment (24 minutes) since a total of 10 + 50, or 60 mL is injected at a rate of 2.5 mL/minute. Consideration should be given tot he size and condition of the victim as treatment is proceeding. The above sodium nitrite injection is about one-third of a lethal dose, so care should be taken to avoid excessive use. It is not essential that full quantities be given, just because treatment was started. Injections can be stopped at any point if recovery is evident.

Watch patient continuously for 24-48 hours if cyanide exposure was severe. If there is any return of symptoms during this period, repeat this treatment using one-half the amounts of sodium nitrite and sodium thiosulfate solutions. Caution should be used to avoid overuse of medical treatment chemicals as the prescribed dose is about 1/3 the lethal dose for an average individual.

If signs of excessive methemoglobinemia develop (i.e., blue skin and mucous membranes, vomiting, shock and coma), 1% methylene blue solution should be given intravenously. A total dose of 1 to 2 mg/kg of body weight should be administered over a period of five to ten minutes and should be repeated in one hour if necessary. In addition, oxygen inhalation will be helpful. Transfusion of whole fresh blood may be considered if there has been mechanical injury with external or internal bleeding and simultaneous cyanide exposure.

Du Pont's experience in treating cyanide poison cases is that first aid procedures using amyl nitrite and oxygen were effective and the only treatment needed in most cases. Medical treatment, using intravenous injections, was used in a few cases. Both procedures have been successful.

PROTECTION INFORMATION

GENERALLY APPLICABLE CONTROL MEASURES

Good general ventilation should be provided to keep dust, mist, and HCN gas below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Recommended Minimum Protection - chemical splash goggles and rubber gloves (butyl or neoprene preferred).

Have available and use as appropriate: face shields; rubber suits, aprons, and boots; disposable toxic dust and mist respirators; self-contained breathing air supply (in case of emergency); HCN detector; first aid and medical treatment supplies*, including oxygen resuscitators.

*See Du Pont Sodium Cyanide Storage and-Handling Bulletin for list of supplies.

DISPOSAL INFORMATION

AQUATIC TOXICITY
The compound is highly toxic (96-hour LC50 = 0.5 - 1 mg/L).

SPILL, LEAK OR RELEASE
Sweep up and shovel into a covered container or plastic bag, pending transfer, to secure the spill. Cover and keep spillage dry. Flush spill area with a dilute solution of sodium or calcium hypochlorite. Comply with Federal, State, and local regulations on reporting releases.

WASTE DISPOSAL
Comply with Federal, State, and local regulations. Do not flush cyanide into sewers which may contain an acid. Detoxify with sodium hypochlorite, or hydrogen peroxide; flush to waste water treatment system; or call a licensed disposal contractor.

SHIPPING INFORMATION

DOT(172.101)	DOT/IMO (172.102)
PROPER SHIPPING NAME Sodium Cyanide, Solid	**PROPER SHIPPING NAME** Sodium Cyanide
HAZARD CLASS Poison B	**HAZARD CLASS** Poison B, 6.1
UN NO. 1689	**UN NO.** 1689
DOT LABEL(S) Poison	

OTHER INFORMATION

REPORTABLE QUANTITY 10 lb/4.54 kg

SHIPPING CONTAINERS
"Wet Flo" railcars and trucks; hopper railcars; Flo-Bins$^{(R)}$ (3000 lb. net); 2000 lb. bag in a box; 100 kilo, 100 lb., and 200 lb. steel drums

STORAGE CONDITIONS
Store in properly labeled containers in dry, ventilated, secured areas. Keep containers closed and contents dry. Do not store with acids or acid salts, containers with water or weak alkalis, or oxidizing agents. Do not handle or store food, beverages, or tobacco in cyanide areas. Do not store near combustibles or flammables because of cyanide solution runoff from water used for fire fighting.

NPCA - HMIS RATINGS

Health	3
Flammability	0
Reactivity	1
Personal Protection	-

E-90005 Date: 1/87

Personal Protection ratings to be supplied by user depending on use conditions.

ADDITIONAL INFORMATION AND REFERENCES

For further information, see Du Pont Sodium Cyanide Storage and Handling Bulletin.

DATE OF LATEST REVISION/REVIEW: 1/87
PERSON RESPONSIBLE FOR MSDS: J. C. Watts, Du Pont Co., C&P Dept., Chestnut Run, Wilmington, DE 19898, (302) 999-4946

SIERRA
CLUB
408 C Street N.E., Washington, D.C. 20002 (202) 547-1141

June 23, 1989

Senator Jeff Bingaman, Chairman
Subcommittee on Mineral Resources Development and Production
United States Senate
Washington, DC 20510

Dear Mr. Chairman,

We are pleased to respond to your request to provide additional information for the hearing record regarding the 1872 Mining Law and S. 1126. We understand that similar questions were sent to the Mineral Policy Center, so to avoid duplication we will not restate their data here but simply add our own perspective. In order, the questions were:

1) What do you think the most critical challenges are for federal land managers in the reclamation area and in terms of environmental protection and mitigation during the life of a mining operation?

At the outset we have to underscore that the most crucial environmental decision facing the federal land manager regarding mining is at the point of approval of surface disturbance. While reclamation is possible in many cases, there are also situations where the landscape and potential uses of the mined area will be irretrievably altered. Also, the cumulative impacts of several mines in an area may overshadow the mitigation measures in place for an individual project. That's why we believe it is vitally important that the federal land manager have as much information before them as possible and have the discretion to modify or even deny where justified mining projects which would pose unacceptable consequences for the other multiple uses for which Congress has mandated our federal lands be managed.

Once the decision is made to allow mining, priority goals for the federal land manager should include stabilization and cleanup of waste, permanent restoration of vegetation, recontouring the disturbed landscape and assuring the long-term visual, air and water quality of the mined area. Cleanup of waste poses a particular problem because most old tailing ponds contain large quantities of toxic wastes, including heavy metals. These huge storage structures are often in upper watersheds. In the post-mining phase, the sides of the containment structures tend to erode and fail and threaten to release toxics into watersheds. There may be no such thing as permanent treatment and stabilization of many of them. They may require perpetual maintenance.

2) Should we consider using some of the fees generated by this bill to fund an abandoned mine reclamation fund for hardrock mines?

"When we try to pick out anything by itself, we find it hitched to everything else in the universe." *John Muir*
National Headquarters: 730 Polk Street, San Francisco, California 94109 (415) 776-2211

Yes. Unreclaimed mine pits litter our countryside in historic mining districts, and often result in acid drainage into the watersheds and the release and transportation of heavy metals and other toxics.

3) Do you generally agree with the General Accounting Office's figure of $284 million as the total cost to reclaim 281,581 acres of disturbed land?

This figure roughly equals $1000 per acre, which would be a significant help but may be too low in some cases.

4) Please provide information on the effects of using cyanide in heap leaching operations.

The short-term problems with cyanide leaching generally center on poisoning wildlife. Over the long-term, such operations can generate significant hazardous waste products which can get into ground waters.

5) The validity of the March 1989 General Accounting Office report of the Mining Law has been questioned.

- Are the examples of the federal government selling lands for $2.50 or $5.00 per acre that later bring much higher prices unusual?

- Do you agree with the conclusions of the report? On what grounds?

While the examples used by the GAO are clearly startling, it would be even more unusual to find land that could be sold for only $5.00 an acre or less. The GAO report garnered lots of media attention throughout the country, but the examples given were not effectively discounted or denied. Another means to judge the value of mining claims is the cost to the federal government to buy them back when it is in the public interest to acquire them for national conservation units. Inquiries to the National Park Service would probably reveal considerable detail on this point.

We appreciate this opportunity to comment.

Sincerely,
Michael McCloskey
Michael McCloskey
Chairman

MEC

MINERALS
EXPLORATION
COALITION

Minerals Advocate
In Public Policy

Reply to:

☐ Lakewood, Colorado

☐ L.C. Lee

Mailing Address:
Box 196
767 South Xenon Court
Lakewood, Colorado 80228

Office Address:
2700 Youngfield
Suite 250
Lakewood, Colorado 80215
(303) 232-4310

Washington Representative
L. Courtland Lee
3814 West Street
Landover, Maryland 20785
(301) 322-5762

June 23, 1989

Senator Jeff Bingaman, Chairman
Subcommittee on Mineral Resources Development and Production
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510-6150

Re: Hearing on the mining law of 1872, June 7, 1989

Dear Senator:

Below you will find the answers to the supplemental list of questions submitted to MEC on June 14, 1989. The response has been prepared by the Minerals Exploration Coalition. We thank you for this opportunity.

1. Please describe the current test for determining "discovery" of a valuable mineral deposit.

- Enclosed please find an article which is our answer to this question. The article is entitled "The concept of discovery: what it is, how it got where it is today, and what can be done about it" by George E. Reeves, an individual member of MEC. Mr. Reeves is an expert on the General Mining Law, and especially on the topic of discovery. He wrote the chapter on discovery in volume no. 2 of the 6 volume definitive work entitled *American Law of Mining*, *2nd edition*, 1984.

1a. Is the test applied consistently?

- The rigor with which the test was applied in United States v. Pittsburgh Pacific Company, 84 I.D. 282 (1977), contrasted with the liberality with which it was applied in Pacific Coast Molybdenum Co., 90 I.D. 352 (1983), leaves the claimant uncertain about how the rule will be applied in any particular case. It should be noted however, that in Pacific Coast Molybdenum Co. the Department of the Interior was not contesting the claim, but defending its own decision to issue a mineral patent. Thus, the only consistency seems to be that the government almost always wins.

2. How does the uncertainty inherent in the current test for discovery affect the miner's security of tenure on an unpatented claim?

- The miner never knows until after a contest whether he has a valid claim or not. Even if a claim is held to be valid, it is valid only at the time of the contest. The government can challenge validity at any later time.
- Diligent occupancy or "pedis possessio" is required to avoid overstaking.
- There is continued risk of overstaking based on the assertion of lack of discovery.

- Without discovery, a withdrawal, even if "subject to valid existing rights," results in a loss of the claim.
- It is impossible to obtain title insurance on an unpatented claim.
- Because the miner cannot obtain title insurance, it is impossible to borrow money using the unpatented claim or its mineral deposit as collateral. Money may be borrowed, but loans are made solely on the quality of the borrower. This means that the "small miner" or the junior mining company are generally unable to secure debt financing.

3. What is significance of the *Amax v. Mosher* decision?

- Judge Bruce Thompson, who heard the case, indicated that he considered the case insignificant by declining to publish his opinion.
- The industry walks on thin ice with respect to the validity of unpatented claims. One never knows when the ice will crack.
- Contrary to the myth perpetuated by the environmental community, mere staking of a claim does not give the locater a property right enforceable against rival locaters, let alone against the U.S. Government.
- Even between rival claimants, discovery is the test of the validity of a claim.
- If negotiations fail, only the courts can resolve disputes between rival claimants.
- Many claims are located and held as though they had valid discoveries. Only upon judicial review by a court is a miner able to determine if his claim has a valid discovery. Even when judicial review is for the purpose of determining priorities, there is a risk that neither claimant has a valid discovery.

4. How many claims are challenged by private interests, i.e. a competing locater?

- Challenges are a relatively common occurrence. Typically in disputes of priority, the right of the senior locater is recognized by the junior locater, regardless of the quality of the discovery.

  Disputes based on assertion of lack of discovery and, sometimes, assertion of failure to do assessment work are more complex. The burden of negative proof is on the junior locater.

  The more exploration and/or mining activity in an area, the more likely it is that there will be layers and overlapping of claims in the area. The degree to which claims are challenged depends on the level of interest in an area. Because exploration risk so dominates other risks, there is little effort in most situations to clear an area of conflicts. Usually there is a willingness to "let sleeping dogs lie" until the potential of an area becomes more clear.

  If good potential for the existence of a valuable deposit can be demonstrated, more effort will be devoted to clearing up title questions. The process typically includes surveying of boundaries, identifying gaps, overlaps, and fractional interests.

4a. What are the results of the challenges?

- Most challenges are resolved by negotiation.
- Title may be cleared by judicial remedies such as quiet title actions.
- Where significant values are involved, rival claimants look to the courts for relief.

5. Please provide examples of the various royalty and lease arrangements and third parties to which your members are parties [sic].

- Unlike the oil and gas industry, where a royalty is traditionally 12.5%, royalties in the mining industry are negotiated on a case by case basis.

- Royalties paid to third parties are negotiated at an arm's length, based upon the amount of geologic information available, and the geologist's perception of the potential economics of any deposit likely to be found on the property.

- Companies pay royalties to private land owners. The explorer evaluates the geology of a site and judges what type and quality of deposit is most likely to be found. With the full knowledge of the nature of the royalty base and of the risks involved, a site-specific royalty is negotiated. If a marginal deposit is found, the explorer may renegotiate the royalty to accommodate the deposit realities. Renegotiation would not be possible if the government-as-landlord were to impose a uniform royalty.

  Land owned by railroad and timber companies is seldom explored as their "standard" royalties are too high to warrant the exploration risk.

- There are two principal types of royalty arrangements that have been common in the industry, Net Proceeds (net profits) royalty, and Net Smelter Return royalty (essentially a royalty on gross proceeds). The objective of the commercial terms of every agreement is to encourage the miner, and at the same time provide a fair return to the land holder or locater.

NET PROFITS ROYALTY. Net profit royalty is perhaps the most common type of arrangement made in the industry today. The net profit interest is the most favored by those in the hard minerals industry, as it conserves the resource. It provides for sharing of profit, the absence of which is a disincentive to mine. And, it provides the operator relief in times of low commodity price. It is fair that the property owner participate, if there are profits. It is also fair that the miner is not obligated to pay for the privilege of losing money.

Net profit royalty definitions vary. In its simplest expression, the royalty is paid on the value of net return on sales, less operating costs, after the recovery of capital. In some agreements interest charges are also recoverable as part of capital.

Net profit interests range from 12% to as high as 40%. Net profit interests of greater than 25% have been negotiated where the property was on trend with known ore, or well located within an established mining area. In the instances of royalties in excess of 25%, there are no provisions for payment prior to recovery of capital. In some agreements, recovery of capital includes interest charges.

NET SMELTER RETURN (NSR) ROYALTY. Because of increasing uncertainty (risk), mining companies rightly object to paying NSR royalties. Uncertainty increased dramatically beginning with the world-wide mining depression of 1982. This increase in uncertainty is due to legislative and regulatory actions and potential actions, fluctuations in inflation rates, volatility in international exchange rates, and increased willingness by third-world producers to continue to produce in the face of metal surpluses and declining price. These risks are new in the 1980's. They are added to the usual uncertainty faced by mining companies, to wit: exploration risk[1]; variability in return between deposits (any discovery has a better chance of being small rather than large; small deposits cannot return the cost of their discovery); price risk; and the risk of unknowns related to mining, processing, and marketing.

Net Smelter Return royalties are typically in the area of 1% where land is unexplored, to 5% in places that are on trend with known ore, or well located within established mining areas. In many agreements there is a cap to the royalty, usually in the form of a purchase price against which all royalties are credited. This means that when the paid royalty equals the negotiated amount, royalties cease and title to the property is transferred to the miner.

- A uniform system of royalty, imposed on some perception of a typical deposit or at some arbitrary rate, will inevitably tax the marginal economic deposits to death. A uniform royalty rate is bad public policy because there is no such thing as a typical deposit. For elaboration please see the written testimony submitted by MEC at the June 7, 1989, hearing.

6. Please define small miner.

No one definition adequately covers all who are categorized as small miners. Small miners are all those in the mineral industry who are not large companies. In many ways the small miner is analogous to the small farmer. The small miner raises money for exploration or development by issuing stock, forming joint ventures and partnerships, and/or using their own finances. The after-tax consequences of exploration already favor the producer (see below).

Today, organizations categorized as small miners include individuals, partnerships, and corporations that have any or several of the following attributes:

- Organizations in which a small number of share holders are the predominant moving force behind the activities of the corporation.
- Companies whose shares are not listed on major stock exchanges.
- Organizations that are active in a local area rather than having regional, national, or international scope.
- Organizations who are represented by state or local organizations rather than by national organizations.
- Organizations staffed by exploration geologists who identify, acquire, and perform initial exploration evaluations on prospective exploration targets. This sector of the small miner population essentially performs the generative ("grass roots") exploration work for the industry.
- Organizations with one, or at most, several operations.
- Organizations with limited ability to obtain financing for projects. Accordingly, larger projects are promoted to larger companies.

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[1] Buried deposits are more difficult to find than those that crop out at the surface. As deposits at the surface are discovered and mined, and as exploration focuses on buried deposits, exploration risk increases. The more intensely an area is explored and depleted, the more substantial the exploration risk.

- Entrepreneurial individuals and small groups of individuals who prefer to work on own their rather than in large organizations. These individuals have the same sort of special bond to the land as have farmers.

- Organizations that spend dollars (risk capital) contributed by investors for exploration and/or development.

  Large mining companies with income from operations spend cash flow on exploration. Because of the exploration and development provisions of the tax code, the after-tax cost of exploration to the small miner is twice that of the larger companies. The small miner commonly has no income against which to write off exploration expenses. This means that the exploration expenses of the small miner are paid with one-dollar dollars. In contrast, the larger companies with income against which to write off exploration expenses spend fifty-cent dollars on exploration.

  This taxation inequity is ironic as the smaller companies (small miners) make such an important contribution to mineral sector development.

We hope these answers will clarify your understanding of this complex topic. If you have other questions or require further elaboration of these answers, please contact us.

Sincerely yours,

G. Snow

Geoffrey G. Snow, Ph.D.
1989 Mining Law Committee Chairman

Enclosure

THE CONCEPT OF DISCOVERY: WHAT IT IS, HOW IT GOT WHERE IT IS TODAY, AND WHAT CAN BE DONE ABOUT IT

Presented to the

Mineral Law Section

Colorado Bar Association

Denver, Colorado

May 13, 1983

By

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THE CONCEPT OF DISCOVERY:
WHAT IT IS, HOW IT GOT WHERE IT IS TODAY, AND WHAT CAN BE DONE ABOUT IT

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The time-honored rule of discovery is the Prudent Man Rule, which was laid down by the Secretary of the Interior in 1894 in the landmark case of Castle v. Womble. 1/ In that case the Secretary said:

> After a careful consideration of the subject, it is my opinion that where minerals have been found and the evidence is of such a character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine, the requirements of the statute have been met. To hold otherwise would tend to make of little avail, if not entirely nugatory, that provision of the law whereby "all valuable mineral deposits in lands belonging to the United States . . . . are . . . declared to be free and open to exploration and purchase." For, if as soon as minerals are shown to exist, and at any time during exploration, before the returns have become remunerative, the lands are to be subject to other disposition, few would be found willing to risk time and capital in the attempt to bring to light and make available the mineral wealth, which lies concealed in the bowels of the earth, as Congress obviously must have intended the explorers should have proper opportunity to do.

Discovery is the all-important fact upon which the title to a mining claim depends. 2/ Moreover, as the Supreme Court has said, it is "the initial fact", 3/ the first step in acquiring title to an unpatented mining claim. In the mining laws Congress has set out a legal system by which a miner can acquire title and eventually a patent to a mining claim on the public lands. The first step in this process is discovery, for the law provides that "no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located". 4/

In recent years, however, the Department of the Interior has stopped viewing discovery as "the initial fact", or "the first step", in acquiring title to a mining claim, and now views it as something that can occur only after exhaustive engineering and economic studies have been made. It has stopped viewing discovery as something which can occur "as soon as minerals are shown to exist, and at any time during exploration", and now views it as something which can occur only when mining operations are about to commence.

Let me refer you to a decision of the Department of the Interior's Board of Land Appeals entitled United States v. Pittsburgh Pacific Company. 5/ In this case, in order to show the existence of a discovery, the claimant was required to show (1) that the requisite water supply could be obtained and delivered at a feasible cost, 6/ (2) that the requisite acreage for the anticipated construction could be acquired in a feasible configuration and at a price harmonious with a profitable mining operation, 7/ and (3) that financing--in the amount of $28,000,000--was available at a feasible interest cost. 8/ The claimant was also required to provide additional information regarding labor and environmental costs. It appears that in the case of the labor costs, the claimant was required to describe each operation and detail why the given number of men at a given wage cost was needed. 9/ In the case of environmental costs, the claimant was required to establish the environmental protection measures which would be required and the cost of these measures. 10/ All of this was required before the Department of the Interior would recognize that the claimant had made a discovery on its claims.

Reading decisions such as Pittsburgh Pacific--and there are others 11/--makes is clear that the Department of the Interior has lost sight of the fact that discovery is but the beginning of the effort to develop a valuable mine. The Department seems to be unaware of the fact that the prudent man's expenditure of his labor and means is an investment of risk capital; the Department is judging the prudence of such expenditures by the same standards which the courts would apply in judging the legality of investments made by trustees acting on behalf of widows and orphans. 12/ As the Board of Land Appeals said in the Pittsburgh Pacific case, "[t]he Department, of course, is most anxious that it not patent the land [which, as is shown below, is the same as saying that it will not recognize the validity of the claim] only to have the project fail". Thus, the prudent man of Castle v. Womble, whose mining claim is valid if the evidence shows merely that he has a reasonable prospect of success if he risks his time and capital, has become the super-prudent man of Pittsburgh Pacific, whose mining claim is valid only if the Department of the Interior determines that his project will not fail.

It seems quite obvious that the law of discovery has taken a wrong turn somewhere, or perhaps several wrong turns. Before we can come to any realistic conclusions about how to get it back on the track, we must find out where it went wrong, and why.

It is my view that there are three major problems in the law of discovery, areas in which fundamental errors have been allowed to creep into the Prudent Man Rule of Castle v. Womble. For convenience, I will refer to these problems as (1) the marketability problem, (2) the development problem, and (3) for want of a better term, the Carlile problem.

Before turning to the marketability problem, I should mention one very important aspect of the Prudent Man Rule, which is that the rule contains two separate requirements. The first requirement is that minerals, whether in a vein or lode, or in a placer deposit, must be found within the limits of the claim. The second requirement is that the evidence must be of such character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine. It is the first requirement--that minerals be found within the limits of the claim--that gave birth to what is now called the Marketability Rule.

Shortly after the enactment of the General Mining Law of 1872 the Commissioner of the General Land Office was called upon to determine whether substances such as borax, sulphur, alum, and asphalt were minerals subject to location and patent. He concluded that whatever is recognized as a mineral by the standard authorities on the subject comes within the purview of the mining laws. 13/ The metallic minerals and certain crystalline nonmetallic minerals came well within the scope of the "recognized by standard authorities" test. For substances lacking a definite composition or a crystalline structure, or both, there were developed two additional tests. The first was whether the substance was classified as a mineral product in trade or commerce. The second was whether the substance has a "special or peculiar value in trade, commerce, manufacture, science, or the arts". 14/ This latter test focuses directly upon the commercial value of the substance to the user. The value to the user--and hence the classification of the substance as a locatable mineral--is measured by the user's desire to purchase the substance or, looking at the matter from the standpoint of the seller, by the merchantability or saleability--marketability if you will--of the substance. In a number of decisions the Secretary of the Interior held that the fact that material extracted from a mining claim had actually been marketed was indicative of the mineral character of the land. 15/

These decisions applied what I call the affirmative aspect of marketability, that is, the concept that the marketability--meaning the merchantability or saleability, whether or not at a profit--of a particular substance is sufficient to establish that it is a mineral subject to location under the mining laws. And if, in addition to showing the saleability of the substance the miner can also show that it has been sold at a profit, then he has established not only that the substance is a mineral subject to location under the mining laws but also that he has made a valid discovery, for by showing that he has sold the substance at a profit he shows not merely that he has a reasonable prospect of success of developing a valuable mine but rather that he has a valuable mine in hand. Thus, marketability at a profit is sufficient to establish the existence of a valid mining claim. But--and this is very important--marketability at a profit, although sufficient, was not always necessary to establish the existence of a valid mining claim. As late as 1944 the Department of the Interior recognized that if marketability at a profit could not be shown, the validity of the claim could still be established by application of the Prudent Man Rule. 16/ In 1958, however, the Secretary of the Interior made present marketability at a profit necessary to establish the validity of a mining claim for nonmetalliferous minerals of widespread occurrence. 17/ After this, the Marketability Rule quickly became the overriding standard of discovery in the case of claims located for such minerals.

Let me give you an example of how, through the wooden logic of the Department of the Interior, the Marketability Rule has been carried to its ultimate conclusion.

In a decision involving lime-bearing materials the Bureau of Land Management held that--

> The mineral materials exposed on the mining claim in issue have had no present market at any time, because there has never been a processing plant available, and in the absence of such a plant the mineral materials on the claims have no commercial value. 18/

Since direct-shipping ore is virtually unknown today, this decision would, if applied to deposits of metallic minerals such as copper, lead, or zinc, make the construction of a mill a prerequisite to the valid location of a mining claim.

I submit that any interpretation of the mining laws which requires the prospector to build his mill before he can make a discovery--before he takes that "first step" toward acquiring title to an unpatented mining claim--has certainly placed the cart far, far in front of the horse.

Let us turn now to the second problem, which I refer to as the development problem.

The early court and administrative decisions were virtually unanimous in agreeing that a considerable amount of exploration might take place after discovery, and that indeed the security of tenure guaranteed by recognizing discovery at an early date was essential to enable the locator to continue his exploration without fear that the land would be claimed by another or disposed of by the United States. In Castle v. Womble,19/ for example, the Secretary recognized that a discovery could be made "at any time during exploration, before the returns become remunerative".

In one early court case, one of the expert witnesses testified that in his opinion there could be no discovery of a vein or lode unless (1) the formation contained gold and silver in sufficient quantities to pay for mining, milling, smelting, and transportation, and (2) the property was developed, by means of tunnels, shafts, or other workings, to the point where it would pay such expenses. The court rejected the theory advanced by the witness and held that it was sufficient if the mineral discovered was "sufficient to justify the locators in expending their time and money in prospecting and developing the ground located". 20/

The same view was expressed in an Alaska case where a discovery was held to exist where the facts "were sufficient to justify the expenditure of money for the purpose of exploration, with the reasonable expectation that, when developed, they would be found valuable as placer claims". 21/

Cases such as these make it clear that a discovery may exist even if further exploration is necessary to determine whether actual mining operations are ultimately justified. The fact that actual mining operations may not yet be justified does not necessarily negate the possibility that exploration itself may be justified by the existence of a reasonable prospect of success in ultimately developing a valuable mine.

Nevertheless, the Department of the Interior, in a line of cases commencing in 1961 with United States v. Altman, 22/ has held that mineralization which only warrants further exploration does not satisfy the Prudent Man Rule; that to satisfy the Prudent Man Rule valuable minerals must be exposed in sufficient quantities to justify development of the claim through actual mining operations.

In other words, the miner must be ready to commence actual mining operations before he can take the "first step"--discovery--toward the acquisition of an unpatented mining claim. In my opinion, this interpretation is the product of a basic misunderstanding of both the history and the purpose of the mining laws.

The final problem area, and in my opinion the most important one, is what I refer to as the *Carlile* problem.

In *United States v. Carlile*, 26/ the Secretary of the Interior held that the same amount of mineralization that is required to support the issuance of a mineral patent is also required to support a valid location. As a result, if the showing of mineralization is insufficient to support the issuance of a patent, not only will the patent application be rejected, but in addition the claim will be declared invalid.

In order to understand how this interpretation could arise, it is necessary to understand that the amount of mineralization required to establish the existence of a discovery, on the one hand, and that required to establish the mineral character of land, on the other hand, do not stand in the same relative positions today that they occupied in 1872.24/

In the years immediately following the enactment of the General Mining Law of 1872, "discovery" meant merely the physical act of finding a vein or lode, or mineral, in the ground in question; commercial value, either in quantity or quality, was not required. The mineral character of land, on the other hand, could be shown only by showing the existence of "known mines" or "paying mines". To obtain a mineral patent a claimant was required to show not merely that he had made a discovery but in addition that the land was mineral in character. Today, however, the situation is reversed. The mineral character of land can be established by geological inference; it is not even necessary that minerals be found in the land. To obtain a mineral patent it is no longer sufficient for the claimant to show that the land is mineral in character, but rather he must show in addition the existence of a discovery.

Since the existence of a valid mining claim is based upon a showing of discovery, not a showing of mineral character, it was, at an early date, recognized that the showing required to establish the existence of a valid mining claim was not a great as that required to establish the claimant's right to a patent. 25/

The distinction between the showing required for a valid location and that required for patent was recognized by the United States Supreme Court in one of a series of administrative and judicial decisions usually referred to as the Clipper cases. The history and outcome of the Clipper cases may be briefly summarized as follows: A placer claimant filed an application for mineral patent to a placer mining claim. This application was rejected on the ground that "the land was not distinctly valuable for placer mining and that the same had not been improved as required by law". 26/ Subsequently, the Clipper Mining Company filed an application for mineral patent to certain lode claims which conflicted with the placer claim. The placer claimant filed an adverse claim and instituted an adverse suit. Clipper contended that the decision rejecting the placer claimant's application for patent was a complete and final adjudication that the ground was not placer ground. The case finally made its way to the United States Supreme Court, which said that although the Department had rejected the application for patent, it did not thereby declare the claim invalid.

The rule of the Clipper cases was recognized in a number of subsequent decisions of the Secretary of the Interior, 28/ and as recently as 1959, the Secretary rejected patent applications without invalidating the claims. 29/ In one such case the Secretary said:

> Denial of the patent application, it should be emphasized again, does not constitute a ruling that the claims are null and void. The applicant's rights in the claims remain as they were before the application for patent was filed and as they would be if no application for patent had ever been filed. 30/

In 1960, however, in United States v. Carlile, 31/ the

Secretary reviewed the entire history of the Clipper cases and, after recognizing that, until discovery, a mining claimant has no rights against the United States, concluded that "[a] claimant cannot rely on a lesser discovery to sustain the validity of his claim than is necessary to entitle him to a patent."

The fundamental error in Carlile is the Secretary's failure to recognize that in the Clipper cases, the rejection of the patent application was not based upon the lack of discovery, but on the failure of the applicant to establish the mineral character of the land. This error no doubt resulted from the Secretary's failure to realize that at the time of the Clipper cases a greater showing of mineralization was required to establish the mineral character of land than was required to establish the existence of a discovery. The Secretary's assumption that Clipper was a discovery (i.e., "location validity") case, when it was in fact a mineral character (i.e., "patent") case, assumes the very question in issue, which is whether a discovery and hence a valid unpatented mining claim can exist even though the ground is not shown to contain sufficient mineral to support the issuance of a patent. The Supreme Court decision in Clipper clearly says that it can.

The reason that Carlile is so important is that now, every time an adjudicator within the Department of the Interior undertakes to determine whether a mining claim is valid, he knows that he will also be determining whether a patent can be issued for that claim. Every decision regarding the validity of a mining claim automatically becomes a decision on the patentability of the claim.

There are four ways in which the law of discovery could be corrected: (1) legislative, that is, by amending the mining laws in Congress, (2) administrative, that is, by getting the adjudicators within the Department of the Interior, which means ultimately the Board of Land Appeals, to revise their interpretation of the mining law, (3) judicial, that is, by getting the courts, which ultimately means the United States Supreme Court, to reinterpret the law of discovery, and (4) executive, that is, by obtaining within the Department of the Interior a reinterpretation of the law of discovery by means other than a case-by-case adjudication.

First, let us look at the possibility of getting Congress to amend the mining laws. Many opinions have been expressed, pro and con, on the advisability of amending the mining laws. I tend to side with those who take the "Pandora's Box" position and say that once the mining laws are opened up for amendment, it will be impossible to say what the end result will be, except that it will be quite different from the mining laws we now know. But there is a more fundamental reason that I believe that we should not attempt to correct the law of discovery by Congressional action, and that is that it is not the statute that has caused the problem, but rather the interpretation of the statute by the Department of the Interior in recent years. From 1872 to the mid 1950's there was no problem with the law of discovery. But starting in about 1958 the Department's interpretation of the law of discovery changed drastically. The Marketability Rule came into full fruition; the requirement that a mining claimant must be ready to commence mining operations before he could be said to have a discovery was imposed; and the amount of mineralization required for a valid location was made equal to that required for the issuance of a mineral patent--all within the space of about three years. Therefore, I believe that it is necessary to focus our efforts upon changing the administrative interpretation of the law of discovery, rather than upon changing the statute itself.

The administrative interpretation of the law of discovery can be changed either directly, by convincing the adjudicators within the Department of the Interior, and particularly the Board of Land Appeals, that their past interpretations were erroneous, or indirectly, either by judicial decisions which provide the proper interpretation of the law of discovery or by regulation or other executive action within the Department which gives the adjudicators proper guidelines for interpreting the law of discovery.

I hold out little hope for convincing the adjudicators within the Department, and particularly the Board of Land Appeals, that their past decisions have been in error. Nevertheless, I do believe that an attempt to do so must be made at every opportunity, if for no other reason than to keep constantly before them the proper interpretation of the law of discovery.

Similarly, I see little hope that the courts will provide any relief. The lower federal courts are caught in a vice, the lower jaw of which is the body of administrative interpretation of the law of discovery which exists in the Department of the Interior, fortified by the doctrine that the Department of the Interior has special expertise in public land matters and its decisions are entitled to great weight, and the upper jaw of which is the decision of the United States Supreme Court in United States v. Coleman ,32/ in which the Court approved what it understood to be the Department's interpretation of the law of discovery.33/ Nevertheless, I believe that the proper interpretation of the law of discovery should be urged in the courts at every opportunity, on the off chance that an astute and courageous judge will examine the subject of discovery independently and in some depth rather than accept the Department of the Interior's interpretation of the law.

The most likely means, in my opinion, by which the law of discovery may be corrected is by executive action, either the promulgation of regulations on the subject of discovery or the issuance of a Solicitor's opinion on the law of discovery, or perhaps both.

In considering at the possibility of the Secretary's promulgating regulations on discovery, the first question to be raised is whether the Secretary has the authority to do so in light of the Supreme Court decision in the Coleman case. In my opinion there is no question but that the Secretary has the authority to issue such regulations. It is important to note that in Coleman the Supreme Court did not undertake to make an independent interpretation of the law of discovery, but merely approved what it understood to be the Department's interpretation. This is made quite clear in the subsequent decision of the Supreme Court in Andrus v. Shell Oil Co., 34/ where the Court said that in Coleman it concluded that the Marketability Rule was "a permissible interpretation" of the law of discovery. Therefore, it appears that the Supreme Court has left the Secretary of the Interior ample room for other permissible interpretations of the law of discovery. The most expedient method of implementing such an interpretation would be the promulgation of regulations on the subject of discovery.

In May, 1982 several representatives (including myself) of Minerals Exploration Coalition, a Denver-based organization comprised primarily of exploration geologists, met with representatives of the Department of the Interior on the subjects of "discovery" and "valid existing rights". I attended a similar meeting in November, 1982 between representatives of the American Mining Congress and the Department of the Interior. As a result of the latter meeting, I drafted a set of proposed regulations on the subject of discovery. On December 27, 1982 the Department of the Interior published a Notice of Intent to Propose Rulemaking, which invited comment on a number of matters, including the definition of discovery.

In February, 1983 Minerals Exploration Coalition submitted the proposed regulations which I had drafted to the Department of the Interior. A copy of the most recent version of these proposed regulations is attached to this paper. I urge you to study these proposed regulations carefully, and to forward any comments, suggestions, or recommendations you might have regarding them to the Department of the Interior.

Finally, I would caution you that even if regulations on the subject of discovery are promulgated in a form favorable to the mining claimant, this does not mean that the adjudicators within the Department of the Interior will not find new ways to misinterpret the law, and to reintroduce the old errors which we are seeking to eliminate. In the late 1950's and early 1960's, the Department of the Interior seems to have encountered little opposition from mining claimants to the drastic changes it was making in its interpretation of the law of discovery. To prevent the same thing from happening again, mining claimants must look upon every mining claim contest proceeding as a potential vehicle for Departmental mischief, and should be ever on the alert to refute any erroneous interpretations of the law of discovery which the adjudicators would impose upon them.

Someone said it once before, but I believe that it is appropriate in the present context to say again, that "Eternal Vigilance is the Price of Liberty".

FOOTNOTES

1. 19 L.D. 455 (1894).

2. Lawson v. United States, 207 U.S. 1 (1907).

3. Creede & Cripple Creek Min. & Mill. Co. v. Uinta Tunnel Min. & Transp. Co., 196 U.S. 337 (1905).

4. 30 U.S.C. § 23. Although discovery is the first step, a locator who has performed the other acts of location before discovery need not repeat those acts after making a discovery. To hold otherwise would be to place form above substance by requiring him to perform an idle and useless ceremony. Creede & Cripple Creek Min. & Mill. Co. v. Uinta Tunnel Min. & Transp. Co., 196 U.S. 337 (1905).

5. 30 IBLA 388, 84 I.D. 282 (1977).

6. With regard to water supply, the Board said:

> . . . [A] prudent man would be assured that an element essential to his mining operation was available, before he would make further expenditures:
>
> > Since water is essential, and its lack makes aggregate production "very costly," it would seem that prudence would demand that the claimants satisfy themselves as to its availability in sufficient quantity before they '[w]ould be justified in the further expenditure of their labor and means, with a reasonable prospect of developing a paying mine.' . . .
>
> * * *
>
> The evidence adduced at the hearing does not fully establish that sufficient water is reasonably available. Pittsburgh stated its volume of water requirement, noted several possible sources for that much water, and argued that there would thus be sufficient water. There was, however, no detailed showing that the rights could be adquired, nor was there any specification of cost of such supply, beyond the general statement of construction costs. On remand, the parties will have the opportunity to show more clearly whether the requisite water supply can be obtained and delivered at a feasible cost.

7. With regard to additional land, the Board said:

> Pittsburgh will require approximately 600 to 900 acres of land outside the mining claims upon which to construct its plants, tailings pond, and water storage reservoir. . . .

* * *

> A reasonably prudent man would take steps to assure that essential land is available to the project. ... On remand, Pittsburgh will have an opportunity to show that it can acquire the requisite suitable acreage for the anticipated construction, in a feasible configuration and at a price harmonious with a profitable mining operation.

8. With regard to financing, the Board said:

> Pittsburgh estimated that . . . some $28,000,000 would be required to finance the project. . . .
>
> * * *
>
> . . . The Board does not believe a prudent miner would continue making his own substantial investments until he has a reasonable expectation of success in developing a valuable mine and of the availability of additional funds, if necessary, at feasible cost. . . . On remand, the parties will have the opportunity to present evidence of financing and other matters as discussed herein.

9. With regard to labor costs the Board said:

> Pittsburgh's case re labor costs was made out by Pavel Zima, an engineer with the company, primarily by means of the economics section of the Mineral Evaluation Report, Exhibit M-4. This report shows operation-by-operation estimates of labor needs and costs, and labor expense is allocated to each processing step. Zima's labor estimates at each step are merely stated, however, and are not explained, describing the operation involved and detailing why the given number of men at a given wage cost is needed.

10. With regard to environmental compliance the Board said:

> . . . The cost of compliance with governmental and other environmental requirements are of course significant in determining whether there has been a discovery.

11. United States Steel Corp., 52 IBLA 319 (1981); United States v. Alaska Limestone Corp., 66 IBLA 316 (1982); California v. Rodeffer, Riverside 0106494 (Mar. 3, 1966), aff'd, 75 I.D. 176 (1968).

12. Some cases have indicated that the standard to be applied is not the "prudent man" but the "prudent investor". See, e.g., United States v. Toole, 224 F.Supp. 440, 444 (D.Mont. 1963). The term "prudent investor" derives from the law of trusts, under which a trustee is permitted to make "only such investments as a prudent man would make of his own property having in view the preservation of the estate and the amount and regularity of the income to be derived". Restatement (Second) of Trusts § 227 (1959). The rule originated

in Harvard College v. Amory, 26 Mass. (9 Pick.) 446 (1831).

13. Circular, Copp, *Min. Lands* (2d) 50 (July 15, 1872).

14. Stanislaus Elec. Power Co., 41 L.D. 655 (1912).

15. Bennett v. Moll, 41 L.D. 584 (1912) (pumice); Stephen E. Day, Jr., 50 L.D. 489 (1924) (trap rock); Layman v. Ellis, 52 L.D. 714 (1929) (gravel).

16. United States v. Dawson, 58 I.D. 670 (1944).

17. United States v. Foster, 65 I.D. 1 (1958).

18. California v. Rodeffer, Riverside 0106494 (Mar. 3, 1967), *aff'd*, 75 I.D. 176 (1968).

19. 19 L.D. 455 (1894).

20. Book v. Justice Min. Co., 58 Fed. 106 (C.C.D.Nev. 1893). In rejecting the theory advanced by the witness, the court said:

> . . . If this theory were adopted by the courts, it would invalidate many mining locations. Logically carried out, it would prohibit a miner from making any valid location until he had fully demonstrated that the vein or lode of quartz or other rock in place, bearing gold or silver, which he had discovered, would pay all the expenses of removing, extracting, crushing, and reducing the ore, and leave a profit to the owner. If this view should be sustained, it is manifest that it would lead to absurd, injurious, and unjust results, destructive of the rights of prospectors and miners, in their honest, patient, and industrious efforts to explore, discover, and develop veins and lodes that exist in the public mineral lands of the United States. . . . The act of congress is not susceptible of any such construction. It does not impose any conditions as to the value or extent of the ore. It simply provides that "no location of a mining claim shall be made until the discovery of a vein or lode within the limits of the claim located."

Although this case involved a dispute between rival mining claimants, the Supreme Court of the United States did not hesitate to cite it as authority in a dispute between a mining claimant and the United States. See Andrus v. Shell Oil Co., 446 U.S. 657 (1980).

21. Lange v. Robinson, 148 Fed. 799 (9th Cir. 1906).

22. 68 I.D. 235 (1961).

23. 67 I.D. 417 (1960).

24. *See generally* 1 *American Law of Mining* §§ 4.50-4.55

(1976); Reeves, "The Origin and Development of the Rules of Discovery", 8 Land and Water L. Rev. 1 (1973).

25. A most persuasive and incisive discussion of the reasons justifying this view was presented by Judge DeWitt in Shreve v. Copper Bell Min. Co., 11 Mont. 309, 28 Pac. 315 (1891):

> There may be a vast difference between mineral ground which is valuable for exploitation and that which appears to be valuable for exploration. There are immense tracts which appear to the miner to be valuable for the latter purpose, and a large portion of which develops to be valueless for the former. This is evidenced by the homey-combed and deserted mountains throughout the mining regions, where toil and wealth have been expended on leads which once attracted the miner's exploration, but where the sound of the pick and the drill is long since stilled. And it is just this fact that has made and will make the mines: the ever present and alluring appearance of value, and the occasional reward of development. Without prospecting, there will be no discovered mines. Without the privilege to claim and locate and hold a discovery, there will be no prospecting. A prospect not once in one hundred times is a mine in sight. If the locator must show a paying mine at location, the riches in these mountains are a locked treasury. The law does not contemplate this. The mineral lands are open for two purposes,--for exploration, and for purchase. Exploration precedes purchase. It opens the way for purchase. Without exploration, purchase would be rare. A miner would desire to purchase the mineral lands at once, if they at once appeared to be of sufficent value to pay to work. He would desire to explore them, if they seemed sufficiently valuable to attract exploration. It is a rare claim that is a mine at the grass roots, or where the paying vein is first found at or near the surface. The history of the mining countries has shown that, in the vast majority of cases, years of toil and thousands of dollars have been required to demonstrate that a mineral vein will pay to work. And in many of them, even after years of immense production, when dead work, prospecting, and development is offset against output, whether they have paid to work is a doubtful proposition. Must the miner await large development and tremendous expenditure before he can take the first steps, by locating and recording, to secure to himself the right of possession, and of a grant from the government, when the great mine is developed? I think not.
>
> Again, the government will not issue a patent for a mine at once upon discovery, no matter how valuable it then appears and actually is. It requires, first, the expenditure of $500 in improvement and development. For what purpose? In order to demonstrate that the claim is of that character that the government will grant the ground as a mine. Before the mining acts of congress, the miner was a

trespasser upon the public domain. The acts of congress gave him rights upon the mineral lands. The object of the requirement of the expenditure of $100 annually before the issuance of patent, and of $500 in the aggregate before patent, was to develop the mines and demonstrate their character. If it were the ordinary nature of valuable mining claims to appear, upon the instant of discovery, to be of sufficient value to pay to work them, why make the requirements of these expenditures in development before the issuance of patent? The whole spirit of the statute, and the construction given by the learned tribunals that have considered them, is not that the prospector must find a paying mine before he can locate his claim. If it were, mining prospecting in these regions would suffer an instant and well-nigh total paralysis. If the fear be suggested that speculative locations may take the public domain, we can do no better than adopt the language of Mr. Justice Field, cited above from Erhardt v. Boaro, 113 U.S. 536, which he concludes with the remark that "a jury from the vicinity of the claim will seldom err in their conclusions on the subject."

26. Searle Placer, 11 L.D. 441, 442 (1890).

27. Clipper Min. Co. v. Eli Min. & Land Co., 194 U.S. 220 (1904).

28. Of particular interest is Brophy v. O'Hare, 34 L.D. 596 (1906), in which the Secretary said:

> . . . To sustain the application for mineral patent, as against persons alleging the land to be non-mineral, it must appear that mineral exists in the land in quantity and of value sufficient to subject it to disposal under the mining laws. In other words, the land applied for must be shown to contain valuable deposits of mineral, which means more than a mere discovery that might be sufficient to support a location in the first instance.

Accord, Cataract Gold Min. Co., 43 L.D. 248 (1914).

29. United States v. Houston, 66 I.D. 161 (1959); United States v. Guglielmetti, A-27871 (May 13, 1959); United States v. Dodson, A-27905 (july 31, 1959).

30. United States v. Houston, 66 I.D. 101 (1959).

31. 67 I.D. 417 (1960).

32. 390 U.S. 599 (1968).

33. 446 U.S. 657 (1980).

PART 3830 - LOCATION OF MINING CLAIMS

Subpart 3834 - Discovery [New]

§ 3834.0-1 Purpose

The purpose of the regulations contained in this subpart is to restate and clarify the law of discovery applicable between a mining claimant and the United States as formulated by the courts and the Secretary of the Interior.

§ 3834.0-2 Objectives

The objectives of these regulations are to provide a clear and unambiguous statement of the rules of discovery applicable between a mining claimant and the United States and to avoid undue rigidity in the application of these rules.

§ 3834.0-3 Authority

(a) Section 310 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. § 1740) provides that the Secretary shall promulgate rules and regulations to carry out the purpose of laws applicable to the public lands.

(b) Section 2320 of the Revised Statutes (30 U.S.C. § 23) provides that no location of a lode mining claim shall be made until the discovery of the vein or lode within the limits of the claim located.

(c) Section 2329 of the Revised Statutes (30 U.S.C. § 35) provides that placer claims shall be subject to entry and patent under like circumstances and conditions and upon similar proceedings as are provided for lode claims.

§ 3834.1 Necessity of discovery

There can be no valid mining claim in the absence of a discovery of a vein or lode of mineral-bearing rock in place, or a mineral-bearing placer deposit.

§ 3834.2 The Prudent Man Rule

A discovery has been made where minerals have been found and the evidence is of such a character that a person of ordinary purdence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine.

§ 3834.3 Minerals

§ 3834.3-1 Definition of "mineral"

A "mineral" is a naturally-occuring metallic or nonmetallic substance that (1) is recognized as mineral, according to its chemical composition, by the standard authorities on the subject, (2) is classified as a mineral product in trade or commerce, or (3) possesses economic value for use in trade, manufacture, the sciences, or in the mechanical or ornamental arts.

§ 3834.3-2 Marketability

Whether a substance is regarded as a valuable mineral under the mining laws depends on its marketability. An intrinsically valuable mineral by its very nature is deemed marketable. On the other hand, if the available deposits of a mineral of wide-spread occurrence far exceed the market, a claimant, in order to establish that the substance is a valuable mineral, may be required to show that there is a present or prospective market for the mineral on his claim. In other cases lying between the extremes mentioned above, such as nonmetallic minerals not of extremely wide-spread occurrence for which a general demand exists, the claimant may be required only to show the existence of a general market.

§ 3834.3-3 Minerals and other substances not subject to location

(a) Deposits of coal, phosphate, sodium, potassium, oil, oil shale, gilsonite (including all vein-type solid hydrocarbons) and gas, and deposits of sulphur in Louisiana and New Mexico, are not subject to location.

(b) Deposits of common varieties of sand, stone, gravel, pumice (except block pumice which occurs in nature in pieces having one dimension of two inches or more), pumicite, and cinders and deposits of petrified wood are not subject to location.

(c) Water and geothermal resources are not subject to location.

§ 3834.3-4 Existence of lode or vein, or placer deposit

A discovery can exist only if minerals have been found within the boundaries of the claim. To constitute a valid discovery there must be actually and physically exposed within the limits of the claim a vein or lode of mineral-bearing rock in place, or a mineral-bearing placer deposit, possessing in and of itself a present or prospective value for mining purposes.

§ 3834.4 Person of ordinary prudence

The prudent man rule is an objective rule. Mere willingness on the part of the claimant to make further expenditures is not sufficient. The evidence must be such that a person of ordinary prudence would be justified in making such expenditures. The standard to be applied is that of the person of ordinary prudence, not necessarily a miner.

§ 3834.5 Expenditure of labor and means

§ 3834.5-1 Factors justifying further expenditures

Among the factors to be considered in determining whether a particular showing of mineral constitutes a discovery are:

(a) Geological factors, such as the nature and extent of the mineral disclosed and the geology of the area.

(b) The existence, location, and history of development of other known mines in the area.

(c) Opinions of miners, geologists, and other experts.

(d) The opportunity which the claimant and his predecessors in title have had to develop the claim.

(e) Technological factors, such as the likely mining and beneficiation methods and metallurgical processes.

(f) Economic factors, such as estimated mining and milling costs, transportation costs, and sale prices.

§ 3834.5-2 Actual operations not required

It is not necessary, in order for a discovery to exist, that actual mining operations be conducted on the mining claim. A discovery may be made at any time, even during exploration, if the evidence is such that at that time a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine.

§ 3834.6 Reasonable prospect of success

The prudent man rule does not require the disclosure of ore of commercial quality or quantity before a valid location can be made, but rather it requires merely a reasonable prospect of success. A proved ability to mine the deposit at a profit need not be shown.

§ 3834.7 Discovery on multiple claim groups

A mining claimant who holds a number of mining claims must show a discovery on each claim. However, in determining whether a discovery exists on any particular claim, whether an individual claim or one of a group of claims, a person of ordinary prudence would take into consideration the fact that several claims are held in common ownership, or that there is a reasonable prospect that they may be held in common ownership in the future.

PART 3840 - NATURE AND CLASSES OF MINING CLAIMS

Subpart 3841 - Lode Claims

§ 3841.3 [Delete]

PART 3860 - MINERAL PATENT APPLICATIONS

Subpart 3862 - Lode Mining Claim Patent Applications

§ 3862.1-1 Application for patent

[Delete second sentence of subsection (a) through end of subsection.]

Subpart 3863 - Placer Mining Claim Patent Applications

§ 3863.1-3 Data to be filed in support of application

[Delete entire subsection (a) and substitute:]

(a) The application should contain such data as will show that title is sought not to control water courses or to obtain valuable timber but in good faith because of the mineral therein. The application should also describe fully the natural features of the claim; streams, if any, must be fully described as to their course, amount of water carried, fall within the claim; and the applicant must state kind and amount of timber and other vegetation thereon and adaptability to mining or other uses.

Subpart 3865 - Valuable Mineral Deposit [New]

§ 3865.0-1 Purpose

The purpose of the regulations contained in this subpart is to restate and clarify the law regarding the showing of a valuable mineral deposit required to support a patent application.

§ 3865.0-2 Objective

The objective of these regulations is to provide a clear and unambiguous statement of the rules regarding the showing of a valuable mineral deposit required to support a patent application.

§ 3865.0-3 Authority

(a) Section 310 of the Federal Land Policy and Management Act of 1976 (43 U.S.C. § 1740) provides that the Secretary shall promulgate rules and regulations to carry out the purpose of laws applicable to the public lands.

(b) Section 2319 of the Revised Statutes (30 U.S.C. § 22) provides that all valuable mineral deposits in lands belonging to the

United States, both surveyed and unsurveyed, shall be free and open to exploration and purchase, and the lands in which they are formed to occupation and purchase.

(c) Section 2325 of the Revised Statutes (30 U.S.C. § 29) provides that a patent may be obtained for land claimed and located for valuable deposits.

§ 3865.1 Necessity

In order to obtain a patent to a lode or placer mining claim the applicant must prove that a valuable mineral deposit exists within the limits of the claim embraced in the application.

§ 3865.2 Showing required

In order to establish the existence of a valuable mineral deposit sufficient to support a patent application, the claimant must show more than would be required to establish the existence of a discovery sufficient to support a location in the first instance.

§ 3865.3 Procedure for determining existence of valuable mineral deposit

It is not necessary that contest proceedings be initiated in order to determine the existence of a valuable mineral deposit, but the existence of a valuable mineral deposit may be determined in a hearing held in the course of the patent application proceedings.

§ 3865.4 Effect of failure to establish existence of valuable mineral deposit

If an applicant for mineral patent fails to establish the existence of a valuable mineral deposit, the patent application shall be rejected. Such rejection shall not affect the validity of the claim (for purposes of res judicata or otherwise) unless, in addition to rejecting the patent application for failure to show the existence of a valuable mineral deposit, it is determined in separate contest proceedings that the claim is invalid for a lack of discovery of minerals sufficient to satisfy the prudent man rule set out in § 3834.2.

Arizona State University

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July 12, 1989

The Honorable Jeff Bingaman, Chairman
Subcommittee on Mineral Resources
Development and Production
United States Senate
Dirksen Senate Office Building
Washington D.C. 20510

Dear Senator Bingaman:

This is in response to your letter of June 14 asking me to provide answers to additional questions growing out of the Subcommittee's June 7 hearing on Mining Law reform. I apologize for my delay in responding.

Before I respond to your specific questions, I would like to offer some comments on the report of the General Accounting Office which was the subject of so much attention at the June 7 hearing on S. 1126, the Mining Law of 1989. At that hearing, Senator McClure asked me to provide additional information on whether GAO had overstated the problems it found in its report, "The Mining Law of 1872 Needs Revision" (GAO/RCED-89-72, March 1989).

Since the hearing, I have reviewed the June 1989 issue of the Mining Congress Journal, which sets out the American Mining Congress' criticism of the GAO report. In my considered judgment, most of the AMC's criticisms are misplaced or positively misleading. I offer the following specific rejoinders in defense of the GAO's findings and conclusions.

I have also reviewed the Bureau of Land Management's comments on the GAO report, as attached to a letter dated June 22, 1989, from James M. Hughes, Deputy Assistant Secretary of the Interior, to John Conyers, Jr., Chair of the House Committee on Government Operations. Some of those comments address issues dealt with by the AMC. In what follows, I will also respond, where appropriate, to BLM's comments as well.

1. The AMC criticism: "More than one-half of [the acreage patented under the Mining Law between 1/1/78 and 9/30/87] was patented for minerals (oil shale and common varieties) that never can be located and patented again." The BLM makes the same argument; namely, that GAO's analysis is skewed because it

"persisted in utilizing as examples of current and future practice, claims patented for minerals that Congress has already removed from operation of the mining law; sand and gravel, common building stone, and oil shale." BLM comments, p. 1.

Response: These criticisms are disingenuous in two important respects.

First, existing claims for these minerals can continue to be patented today. This is because both the 1920 Mineral Leasing Act (which made oil shale leasable) and the 1955 Common Varieties Act (which made so-called "common varieties" of widely occurring minerals like sand, gravel, and building stone subject to sale rather than location under the Mining Law) sheltered existing claims for these substances from the new regime. This grandfathering of old claims is, of course, why Congress has been using some of its valuable time over the past three years debating whether to forbid further patenting of the remaining hundreds of thousands of acres of oil shale mining claims.

I do not have hard information on the number of acres of pre-1955 claims for "common varieties" of common substances that are still in existence. It should be remembered, however, that the Mining Law's lure of free sand, gravel, clay, building stone, limestone, pumice, pumicite, gypsum, and cinders was a powerful one, even prior to 1955, because alternative sources (on state and private lands) were not free. Such claims became even more coveted when Congress prospectively closed this loophole in 1955.

Because mining claims are so cheap to maintain under current administration of the Mining Law, I would be surprised if many of these pre-1955 claims have been voluntarily relinquished or abandoned. Therefore, one might reasonably infer that thousands of these pre-1955 claims still exist, covering perhaps hundreds of thousands of acres of federal land.

For this reason, the impression left by AMC's statement that such claims "never can be . . . patented again" is simply false. This chapter in Mining Law history has not yet closed. AMC and BLM's criticism here is akin to a manufacturer of an unsafe automobile arguing that, because that particular model will no longer sold, the thousands still on the road may be ignored.

Second, the 1955 Act did not forbid all new claim location for widely occurring minerals. It is still possible today to locate claims for sand, gravel, stone, and the like, and if challenged to argue that the deposits within the claims are an "uncommon" variety of these substances.

If such a claimant follows the correct procedures and persuades the Department of the Interior or a reviewing court that the deposit has, in the words of the statute, "some property giving it distinct and special value," the claimant can still obtain a patent to the mineral and the land surface. The Interior Department has concluded, for example, that unique coloration (United States v. Chartrand, 80 I.D. 408 (1973)), or natural fracturing and flat surface cross-sectioning that reduces the cost of extraction and installation (see United States v. McClarty, 81 I.D. 472 (1974)), are characteristics that support a finding of "uncommonness" for building stone. For a discussion of the reported decisions, see American Law of Mining 2d, section 8.01(4)(a).

Such patents are, moreover, issued without regard to whether the claim is located near a popular ski area, or on a prime shopping center or resort site, or in or near a residential subdivision, or in a spawning bed on a blue-ribbon trout stream. (These examples are not casually chosen; they are, or echo, actual cases in Mining Law history. See, e.g., pp. 57-77 of my book, The Mining Law: A Study in Perpetual Motion, published by Resources for the Future in 1987.)

Reported opinions on whether varieties are "common" or "uncommon" rival those on the law of discovery, discussed further below, in numbers and complexity. Because the Mining Law is so advantageous to the claimant (requiring no rental or royalty, and the possibility of fee simple title to the land), arguing "uncommonness" is tempting. The Forest Service put it this way last year in proposing new rules to attempt to clarify distinctions between "common" and "uncommon" varieties:

"Over a period of years, several hundred cases in litigation have addressed which mineral materials are to be considered common. [The uncertain definitions have meant that persons] have frequently located mining claims under the Mining Laws of the United States [for common varieties subject only to sale], creating title and economics problems, unnecessary litigation, and delays in completing sales." 53 Federal Register 15236 (1988).

In short, the flabbiness of the 1955 Act's prospective limitation of claim location to "uncommon" varieties of common substances is an additional reason why the AMC's and BLM's rebuttal is misplaced.

2. AMC Criticism: GAO's estimates of the value of land embraced within a number of claims recently patented or currently subject to patent application were "inflated . . . immeasurably" by the fact that the claims were "near metropolitan or resort areas."

Response: This again is clever phrasing, but it does not challenge the accuracy of GAO's appraisals. In fact, common sense suggests that persons seeking to reap a windfall from the high surface values of land patented under the Mining Law will locate or acquire mining claims near metropolitan or resort areas because, in Willie Sutton's timeless reply to the query why he robbed banks, "that's where the money is."

BLM's comments take a somewhat different, but equally misleading, tack. BLM says that GAO unfairly relies on appraisals of surface values of lands comparable to those subject to mining claims to estimate the surface value of the claims. BLM assumes that the patentee of the claim would sell only the surface estate, and retain the mineral rights. Because the mineral estate is ordinarily dominant over the surface estate, the BLM reasons, the surface value has to be discounted substantially because its value would be diminished if mining of the reserved mineral estate occurs.

The fatal flaw in this reasoning is, of course, BLM's assumption. If land is worth more for its surface values than its mineral values, and if mining would interfere with those surface uses, a prudent person would not mine it. Furthermore, a prudent person seeking a patented mining claim for a use other than mining will purchase the mineral as well as the surface estate, to prevent its being mined. BLM concedes as much later in its comments by acknowledging that the Melluzo building stone claim patented in Phoenix in 1970 is not being mined because "it is the site of a new resort hotel. For such an investment to be undertaken, the hotel developers have obviously acquired the mineral rights as well."

Therefore GAO's methodology is correct; comparing surface values of neighboring tracts is often the best evidence of the value of patented mining claims.

3. AMC Criticism: A number of patent applications for land that GAO concluded was far more valuable for non-mining purposes have either been withdrawn by the applicant or contested by the BLM or Forest Service. GAO left the "false impression that the applications would likely be granted."

Response: AMC would like to leave the impression that patents for these lands cannot and will not be granted. That is not necessarily true.

First, patent applications voluntarily withdrawn by the applicant can be revived or renewed at any time, in perpetuity, under the Law as it is currently administered. In fact, one cannot help but suspect that a factor in the decisions to withdraw some of the applications examined by GAO might have been to avoid the glare of the spotlight trained on the patenting feature by the GAO. A competent lawyer would probably advise a client who has a pending patent application for land far more valuable for non-mineral than mineral purposes to lay low until that spotlight is extinguished, as it unfortunately has been many times in the long history of this Law.

Second, as for patent applications being contested by the federal agencies, initiating a contest is hardly tantamount to succeeding. Most contests are vigorously defended by the claimant. The vague and shifting contours of the discovery test commented on further below hardly foster predictability in results, no matter how flimsy the evidence of mineral value.

Indeed, BLM's comments substantially refute AMC's position on this point. BLM points out that about one of every three acres subject to a non-oil-shale patent application in the past decade has in fact been patented by the Department. (BLM goes on to say that of the 55,000 acres of claims located for gold on which patent has been applied for in the past decade, 20% has been patented, 20% is "pending final decision," 14% has been withdrawn by the applicant, 11% was rejected "for technical reasons," and 35% was successfully contested by the Bureau (usually for lack of discovery).)

GAO does not argue in its report that applying for patent is a guarantee of receiving one. Nevertheless, BLM's data show that, statistically, an applicant has a reasonable chance of securing a patent.

Part of the problem with contests is that the Department of the Interior takes the position that the value of the land for non-mining purposes is simply not relevant to the patenting decision. Instead, "the test of discovery is the same whether the land be unreserved public domain, land in a national forest, or even land in a national park." Pacific Coast Molybdenum Co., 90 I.D. 352, 363 (1983).

For these reasons, GAO's concern that the Mining Law allows divestiture of valuable federal property for non-mineral ends is valid. In a backhanded way, AMC actually concedes this when it says that "most" (rather than "all") of the 12 patent applications that GAO examined and identified as have non-mineral values far in excess of their mineral values would not be patented.

4. AMC Criticism: GAO's conclusion that the Mining Law's assessment work requirement is widely ignored and has little effect on development is untrue, because BLM "enforces the provision that failure to comply with the work requirement will render the claim subject to cancellation."

Response: GAO is correct. To my knowledge, BLM has rarely if ever - outside the special context of oil shale - sought to invalidate any claim solely for lack of performance of assessment work. There are several reasons for this.

First, as AMC recognizes five paragraphs later, invalidation on this basis is absolutely meaningless if the land is still open to the Mining Law. The invalidated claim can simply be relocated. Thus, challenging claims for lack of assessment work is a waste of time and energy where the land is not withdrawn from the Mining Law. BLM concedes as much, commenting that its "policy" is to contest claims for failure to perform assessment work only in "situations in which the land and/or minerals are closed to the operation of the Mining Law."

Second, it may not be easy to show, over the claimant's protest, that the pittance of work required has not actually been done.

Third, the AMC and its members have vigorously resisted the Department of the Interior's position that it has the legal authority to enforce this assessment work requirement. This fact is conveniently ignored in AMC's response, which leaves the impression that AMC welcomes federal enforcement of the requirement.

In industry's view, only competing claimants can seek to invalidate claims for failure to perform assessment work. The issue has never been conclusively resolved in the courts because the federal government has never (to my knowledge) enforced it except in the oil shale context. While the issue was presented to the court in the Tosco litigation over oil shale, the Department settled the case before a final decision was reached. (For more information on this, see my book at pp. 113-16, and Tosco Corp. v. Hodel, 611 F. Supp. 1130, 1179-96 (D. Colo. 1985); vacated, 826 F.2d 948 (10th Cir. 1987).)

As a practical matter, all this argument over the Department's enforcement of the assessment work requirement is refuted by the Department's "long-held concept," as BLM puts it, "that diligence is best promoted by those willing to take the risks themselves;" that is, by other claimants, not the government.

5. AMC Criticism: GAO's finding that the assessment work requirement has resulted in needless scarring of the landscape is untrue; claimholders must "notify" the federal agencies of any operations that "could result in significant surface disturbance [and i]f it is determined that the method of exploration . . . would scar the lands needlessly, BLM or the Forest Service can halt the activity."

Response: What AMC fails to say is that BLM, under pressure from the AMC (and in contrast to the Forest Service) decided not to require claimants to submit plans for approval in advance for operations causing a cumulative surface disturbance of 5 acres or less in any calendar year. Compare 43 C.F.R. 3809.1-3 (BLM) with 36 C.F.R. 228.4 (Forest Service). Instead, BLM opted for a simple "notice" requirement, and specifically provided that "approval of a notice by the [BLM] is not required." 43 C.F.R. 3809.1-3.

In each of the last five fiscal years. BLM has received between 1823 and 2107 of these "notices." (Public Land Statistics 1988, p. 82.) AMC provides no clues as to how the BLM is supposed to review each of these notices, determine which ones may "scar the lands needlessly," institute a lawsuit in federal court challenging needless activity, and persuade a federal judge to issue an order stopping it. This all must be done within fifteen days of receipt of the notice, because that is all the advance warning the BLM regulations require the claimant to provide. Id.

It can scarcely be surprising that the BLM has never, to my knowledge, instituted such an action. One can hardly imagine a more toothless "safeguard" against needless abuse than that offered by the AMC.

Summary and Conclusion on GAO report:

As these responses suggest, AMC's overwrought criticisms of the GAO report ("unprecedented," "lack of objectivity," "preordained agenda," "conceptually invalid, in plain error, or factually incomplete") are simply not persuasive. The criticisms AMC levels at the GAO could be made of AMC's response, for far from being unprecedented, GAO's main conclusions merely repeat and confirm similar results reached by a very long line of similar investigations performed by a variety of agencies in and out of government. (For details, see my book at pp. 57-83.)

The attack on the GAO report is, in my judgment, a classic case of attacking the messenger because the message is unwelcome. I hope it will not deflect the Congress from addressing the legitimate and serious problems the GAO report identifies.

If you would like further information on the current problems arising from field administration of the Mining Law, I would suggest (if you have not done so already) that you ask the BLM and the Forest Service to furnish you with copies of any memoranda prepared by field or headquarters offices over the past several years on administration of the Mining Law. At Interior, I suspect analyses of the problems discussed above might have been compiled by the Task Force that worked for several years in the mid-1980s on codifying and revising Interior's Mining Law regulations. See 47 Federal Register 57521 (1982). (Unfortunately, the Task Force disbanded without proposing new regulations.) At the Forest Service, such analyses may have been prepared for the Interior Task Force or in connection with the Forest Service's own proposal, published at 53 Federal Register 15236 (1988), to revise its regulations elaborating on the difference between "common" and "uncommon" varieties.

Now, finally, I will respond to the questions you asked.

1. Please describe the current test for determining "discovery" of a valuable mineral deposit. Is the test applied consistently? Are the results of cases consistent?

The test the Department of the Interior most frequently applies to discovery is the "prudent person" test: Whether the claimant has "found a mineral deposit of such quality and quantity that a person of ordinary prudence would be justified in the further expenditure of his time and means with a reasonable prospect of success in developing a valuable mine." U.S. v. Foresyth, 94 I.D. 454, 466 (1987).

In fact, however, this is not the only test the Department and the courts have applied. The discovery doctrine has taken many twists and turns through its long history. (For details, see my book at pp. 119-67.) At one time or another, it has been shaped to serve various purposes, including:

-- Fixing how the Mining Law is to apply to widely occurring substances like sand and gravel, as compared to precious substances;

-- Weighing the comparative values of land for mining or non-mining purposes;

-- Combating the problem of abuse of the Mining Law for non-mineral ends;

-- Serving the different needs of the public interest (when the federal government challenges a claim for lack of discovery) versus conflicting private interests (when a competing claimant challenges a claim for lack of discovery); which can hinge on whether a discovery examination is triggered by a patent application (where land divestiture would result) as opposed to a challenge to an unpatented claim (where title to the land would remain in federal ownership);

-- Reflecting variable judgments about the prospective value of particular minerals (e.g., "discovery" has been found for oil shale even though no commercial production has ever occurred).

These different discovery inquiries have been fashioned and applied by many disparate judicial or quasi-judicial bodies, including federal courts, state courts, and the Department of the

Interior's Board of Land Appeals, as well as by attorneys in the Solicitor's office in the Department of the Interior and the General Counsel's office in the Department of Agriculture. In some cases, in fact, discovery may be a question to be submitted to a jury. See, e.g., Alyeska Pipeline Service Co. v. Anderson, 629 P.2d 512 (S.Ct. Alaska, 1981), cert. denied, 454 U.S. 1099.

The Department of the Interior has never adopted regulations defining and clarifying discovery. It considered doing so for a time in the early 1980s, but gave up the challenge, apparently finding it hopelessly complex and controversial. See 47 Federal Register 57521 (1982).

Congress has never attempted to define discovery either. In the absence of clarifying legislation, the United States Supreme Court presumably has the final word, but its decisions are unfortunately as variable as the others. Thus, all concerned have continued to stumble along, mining the variegated veins of past decisions.

Some principles are relatively clear, but their clarity only adds to the confusion. For example:

-- The claimant does not need to be actually producing (or poised to produce) minerals to have a discovery.

-- On the other hand, actual production may not suffice to demonstrate a discovery.

-- The market price of the mineral is relevant to the discovery determination, but the Department of the Interior has taken the position that a line must be drawn somewhere on the continuum between short-term market perturbations and long-term trends in mineral prices.

-- The market that exists for the mineral is relevant, but some minerals have a world market, while others have only regional or even very local markets.

-- The cost of production is relevant, and this includes the cost of complying with applicable federal, state and local environmental regulations. As these jurisdictions enact new regulations, "discovery" inquiries may be affected substantially.

-- Discovery must be shown on each claim; a finding that discovery exists on one claim will not, without more, suffice to demonstrate a discovery on adjacent claims.

-- Discovery once established on an unpatented claim may be "lost" as a result of changing economic conditions; e.g., the decline in the market value of the mineral. See, e.g., Mulkern v. Hammitt, 326 F.2d 896 (9th Cir. 1964).

In short, "discovery" has always been an elusive concept to apply to mining claims. The leading scholar on the Mining Law, Judge Curtis Lindley, put it well in 1914 when he said "it is difficult to formulate a definition [of discovery] sufficiently comprehensive in itself to cover all possible exigencies." American Law Relating to Mines and Mineral Lands (3d ed. 1914), vol. 1, sec. 98. Or, as the Eighth Circuit Court of Appeals put it in 1919, discovery "has no rigidly fixed meaning . . . . owing to widely varying conditions to which the expression must be applied." U.S. v. Safe Investment Gold Mining Co., 258 F. 872, 876.

Three-quarters of a century later, the situation has not improved. Indeed, it has become more complex with the enactment of many new regulatory laws, and thousands of additional decisions from the courts and agency tribunals. Chapter 35 of the American Law of Mining 2d contains 84 pages of discussion on the subject.

One final twist: As the Department of the Interior currently administers the law, if the BLM, Forest Service, or Park Service challenges a claimant for lack of discovery and the Department's Board of Land Appeals finds that a discovery exists, the agencies are forbidden from seeking judicial review of that decision. If the Board agrees that no discovery exists, on the other hand, the claimant can (and often does) seek review in the courts.

2. How does the uncertainty inherent in the current test for discovery affect the miner's security of tenure on an unpatented claim?

It undermines it, because it constitutes a continuing cloud on the validity of the claim. Unlike a mineral lease, where the term is fixed by statute, an unpatented mining claim is always, from location until issuance of a patent, vulnerable to challenge for lack of discovery. Such a challenge may be brought by the government, by competing miners, or by any others with an interest in the land subject to the claim.

3. What is the significance of the Amax v. Mosher decision?

First, it nicely illustrates the uncertainties in discovery. Despite all the investigation and exploration done by each of the competing claimants in that case, the court concluded that none of them had established a discovery.

This is not an aberrant decision. Rather, it is a straightforward application of the Mining Law. The district court's decision was not appealed; in fact, the court apparently regarded it as so much in the mainstream of Mining Law jurisprudence that it did not certify the decision for publication in the official reporter.

More important, the Mosher case illustrates a very important implication of discovery's shifting sands. If there is no discovery, the claimant has no protection against a government's decision to use the land for some other purpose, because there is no protected "property" interest in a claim without a discovery. It is, instead, merely a revocable license, the same kind of interest that, for example, casual hikers have on federal land.

Moreover, the claimant can protect himself against other claimants only by, in most states, continuously occupying the claim in active exploration. (This is the "pedis possessio" or foothold doctrine discussed in my book at pp. 95-107.) If a claimant walks off the claim, perhaps even for a brief vacation, another claimant can "jump" the claim. This is what happened in Mosher. As it illustrates, the "foothold" doctrine might be more accurately described a "toehold" or even "fingernail hold" doctrine, because security of tenure during exploration is so tenuous.

The net result of all the effort expended by the various claimants in the Mosher case to locate and litigate their claims was exactly zero. The court's melancholy conclusion: "The land remains in the public domain open to peaceable exploration by the parties or by any other citizen." (emphasis added)

The law on pedis possessio is subject to a further uncertainty -- it is mostly established by state courts, with varying results from state to state. Unlike questions of discovery, it is not even clear that the United States Supreme Court could (even if it wanted to) adopt a uniform national rule on the subject, because no federal interest is directly implicated in these contests between competing claimants where only pedis possessio is an issue. The federal government was not, for example, a party to the Mosher litigation.

4. How should a royalty on mineral production be structured and administered?

I am not an expert in this area, and I would like to defer a definitive answer until I can study the subject in more depth. I can, however, offer a few suggestions now. Although I referred in my June 7 testimony to the distinction between royalties on "gross" and "net" values of mineral production, it should be understood that these are terms of convenience, not art. Thus any statutory royalty provision ought to consider defining as specifically as possible what deductions, if any, are possible from the value of the ore in place to arrive at the basis for a royalty.

An alternative approach would be to incorporate the practices already used under one or more of the many federal mineral laws that provide for royalties; e.g., 30 U.S.C. 226(b)(1)(A) (oil and gas); 30 U.S.C. 207 (coal). Likewise, many state laws provide for payment of royalties on minerals developed on state lands, and these too might usefully be consulted. See, e.g., T. Stinson and G. Temple, State Mineral Taxes - 1982 (Rural Development Research Report No. 36, Economic Research Bureau, U.S. Department of Agriculture).

On royalty administration, I suggest looking at the problems that surfaced with federal oil and gas royalty accounting in the early 1980s that led to enactment of corrective legislation on the subject, the Federal Royalty Management Act of 1982, 30 U.S.C. 1701-1757.

Finally on this question of royalties, reform legislation should make clear that the states can levy severance and other taxes in addition to any federal royalty a reform bill includes. Supreme Court decisions dating back more than a century have recognized the right of states to tax unpatented mining claims. See, e.g., Forbes v. Gracey, 94 U.S. 762 (1877). This principle ought not to be disturbed. The Mineral Leasing Act takes the same approach. See 30 U.S.C. 189; Commonwealth Edison v. Montana, 453 U.S. 609 (1981).

In closing, I offer one additional observation on the general subject of reforming the Mining Law. Attached is a copy of an article that appeared in the Wall Street Journal a few weeks ago describing how the Japanese struck gold in Indonesia by means of satellite remote sensing technology. Yet here in the U.S, we still operate under a Mining Law enacted before the invention of the telephone. The problems described in this letter make clear that this Law is not working, and will not work, to meet the challenges ahead.

Thank you for the opportunity to testify on June 7 and to address these further questions. I remain available to provide any additional information or other assistance you may want.

Sincerely,

John D. Leshy
Professor of Law

cc: Senator Dale Bumpers
Senator James McClure

Wall Street Journal, May 5, 1989

Satellites Are Given An Earthly Role: Discovering Gold

5/5/89

* * *

Japanese Employ Pictures To Find Mineral Deposits; Wider Uses Are Expected

TOKYO (Reuter)—The Japanese have struck gold in Indonesia—by sitting in a lab in Tokyo gazing at pictures.

Using advanced satellite technology called remote sensing, a group of Japanese scientist-prospectors recently discovered a major gold deposit on the remote Indonesian island of Lomblen, north of Timor.

It was the first publicized case of a mineral deposit being found by satellite alone. Tokyo announced last month that Jakarta would develop the site.

A team led by government researcher Ryoichi Koda found the gold in photographs taken by the American Landsat-6 and France's SPOT-1 earth-surveying satellites.

"We are sweating in the lab in search of a jackpot, just as our predecessors did in jungles or canyons," said Toru Kawakami, a senior geologist at Tokyo's Earth Resources Satellite Data Analysis Center.

Up until now, information gathered by satellite has been used only to supplement data obtained through proven forms of research, including aerial surveys, trekking on foot to collect samples and costly drilling.

With its abundant funds and technology, Japan is taking satellite prospecting further.

"This will become the mainstream in resource development projects in the next decade," said Jiro Komai, technical manager of the semi-governmental data analysis center. "We need this to catch up with expected shortages in various natural resources."

Most of the world's remaining undiscovered deposits of mineral ores, oil and precious metals are believed to be in remote locations where the cost of exploration is often prohibitive, Mr. Komai said.

"We only need a few dollars per square meter (or square yard) for remote sensing while drilling a 3,000-meter (10,000-foot) deep oil well requires as much as $10 million," he said.

The satellites carry a light sensor that enhances relative reflections of visible and infrared spectrums emitted from the Earth's surface. Scientists then can estimate surface conditions through gradations of colors. Each mineral has a different shade of color.

By February 1992 Japan is planning to send into orbit its own resource exploration satellite, the Earth Resources Satellite ERS-1.

The ERS-1 will be the first of its kind to be equipped with advanced sensor systems specifically designed to obtain detailed geological data.

"In the 1970s, without satellites, we could only hope for three lucky cases out of a thousand trial explorations," said Kyoichi Koyama, director of the government's Metal Mining Agency. "But now, with our sophisticated satellites, we can hope for one out of a hundred."

The ERS-1 will be able to take photographs of the Earth's surface using a wider range of wavelengths to obtain more detailed geological data than Landsat and other conventional earth-surveying satellites.

A high-tech radar is also aboard, which transmits microwaves that penetrate surface vegetation and sand to detect clues leading to underground deposits. Development of computer software to analyze this information is also under way.

LA Times 6/25/89 Part II p 1

Deadly Incident in the Hills

San Diego County Mountain Hamlet of Julian Does 'Slow Boil' After Fatal Shootings of Two in Dispute Over Mining Claim

By ERIC BAILEY, *Times Staff Writer*

JULIAN, Calif.—Not in Julian. This sort of thing doesn't fit a mountain hamlet known for apple pie and friendly townsfolk. It's not a spot where blood should be spilled.

But sure enough, it happened. In a rugged gorge on the backside of town, a bearded young mountain man named Chris Zerbe set out on Memorial Day to roust some claim jumpers near a gold mine he tended. Joe Lopes, an affable old-timer with a gravelly voice and a penchant for drink, went along for the ride.

They didn't live to tell what happened next. Staccato gunfire rang through the hills. When help arrived, Zerbe lay mortally wounded. Lopes was already dead.

None of it made much sense. The gunmen, an El Cajon family and friends, had filed a claim of their own to prospect on the mine site. Their intentions appeared innocent enough—a day of picnicking, target practice and poking around the property. Then the deadly confrontation unfolded.

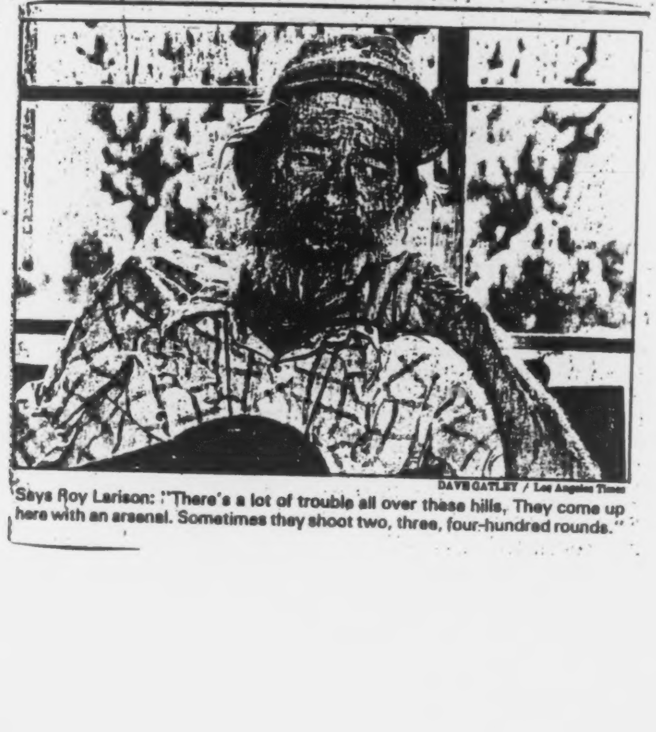
Family members contend that they fired in self-defense when Zerbe sent a gunshot whizzing their way. Investigators, armed with only the survivors' side of the story, have yet to file charges or fully assess blame for the bloody standoff.

With its lingering mystery, the episode has blanketed this peaceful mountain town amid the pines with anxiety. It all seems a century too late, a throwback to the lawless days of the late 1800s, when gold was first discovered in these parts and Julian became a boom town.

To some townsfolk, however, the slayin of Zerbe, 34, and Lopes, 66, appeared sadl emblematic of a simmering tension be tween locals and unruly urban visitor Dubbed flatlanders, these outsiders fron off the mountain have been accused o stirring up bad feelings, traipsing ont private property, vandalizing homes an shooting up the countryside. It's only handful of bad apples, folks realize, but th problems are there all the same.

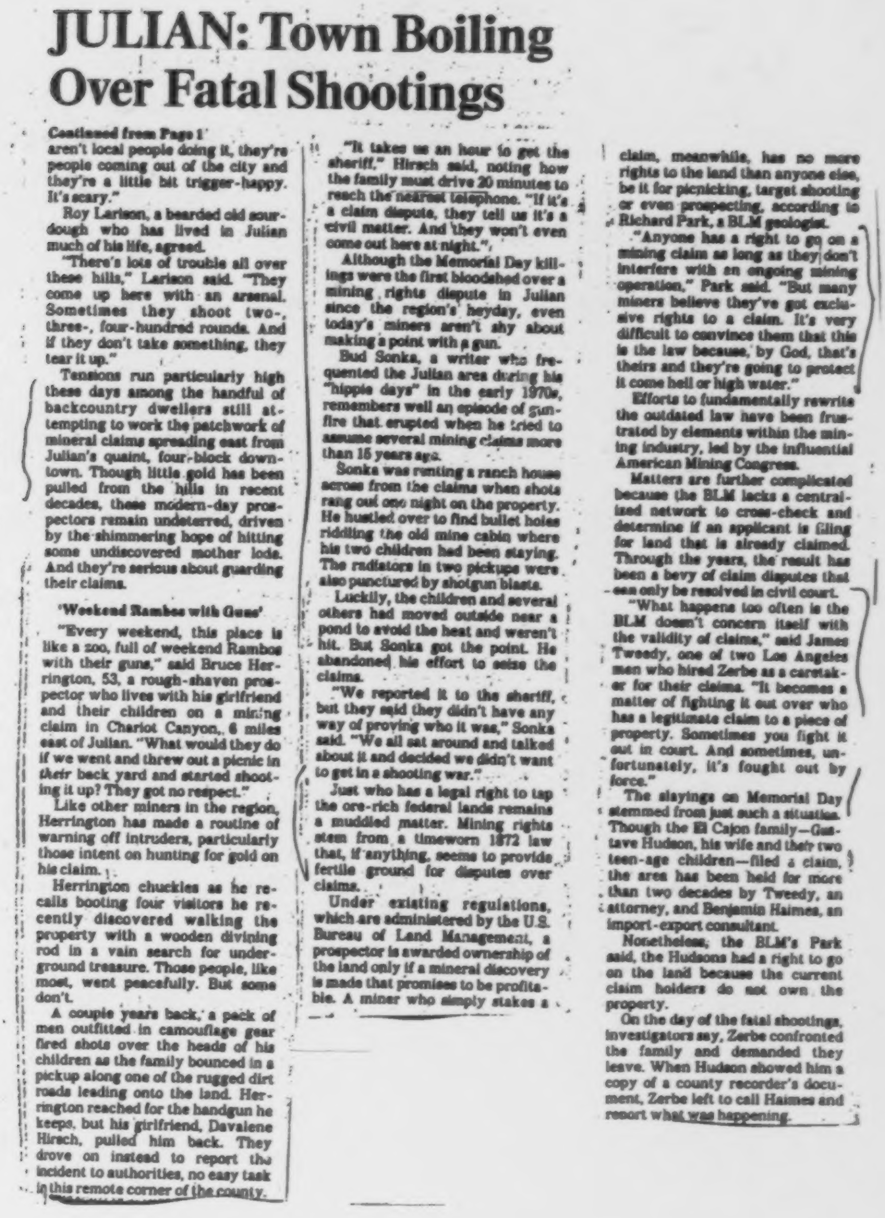
"There is kind of a resentment. Peopl from the city don't always respect th property rights out here," said Glen Larson, a boyhood friend of Zerbe. "During hunting season our ranchers have had cattle shot, they've had horses shot. These

Please see JULIAN, Page 5



DAVE GATLEY / Los Angeles Times

Says Roy Larison: "There's a lot of trouble all over these hills, They come up here with an arsenal. Sometimes they shoot two, three, four-hundred rounds."



JULIAN: Town Boiling Over Fatal Shootings

Continued from Page 1

aren't local people doing it, they're people coming out of the city and they're a little bit trigger-happy. It's scary."

Roy Larison, a bearded old sourdough who has lived in Julian much of his life, agreed.

"There's lots of trouble all over these hills," Larison said. "They come up here with an arsenal. Sometimes they shoot two-, three-, four-hundred rounds. And if they don't take something, they tear it up."

Tensions run particularly high these days among the handful of backcountry dwellers still attempting to work the patchwork of mineral claims spreading east from Julian's quaint, four-block downtown. Though little gold has been pulled from the hills in recent decades, these modern-day prospectors remain undeterred, driven by the shimmering hope of hitting some undiscovered mother lode. And they're serious about guarding their claims.

'Weekend Rambos with Guns'

"Every weekend, this place is like a zoo, full of weekend Rambos with their guns," said Bruce Herrington, 53, a rough-shaven prospector who lives with his girlfriend and their children on a mining claim in Chariot Canyon, 6 miles east of Julian. "What would they do if we went and threw out a picnic in *their* back yard and started shooting it up? They got no respect."

Like other miners in the region, Herrington has made a routine of warning off intruders, particularly those intent on hunting for gold on his claim.

Herrington chuckles as he recalls booting four visitors he recently discovered walking the property with a wooden divining rod in a vain search for underground treasure. Those people, like most, went peacefully. But some don't.

A couple years back, a pack of men outfitted in camouflage gear fired shots over the heads of his children as the family bounced in a pickup along one of the rugged dirt roads leading onto the land. Herrington reached for the handgun he keeps, but his girlfriend, Davalene Hirsch, pulled him back. They drove on instead to report the incident to authorities, no easy task in this remote corner of the county.

"It takes us an hour to get the sheriff," Hirsch said, noting how the family must drive 20 minutes to reach the nearest telephone. "If it's a claim dispute, they tell us it's a civil matter. And they won't even come out here at night."

Although the Memorial Day killings were the first bloodshed over a mining rights dispute in Julian since the region's heyday, even today's miners aren't shy about making a point with a gun.

Bud Sonka, a writer who frequented the Julian area during his "hippie days" in the early 1970s, remembers well an episode of gunfire that erupted when he tried to assume several mining claims more than 15 years ago.

Sonka was renting a ranch house across from the claims when shots rang out one night on the property. He hustled over to find bullet holes riddling the old mine cabin where his two children had been staying. The radiators in two pickups were also punctured by shotgun blasts.

Luckily, the children and several others had moved outside near a pond to avoid the heat and weren't hit. But Sonka got the point. He abandoned his effort to seize the claims.

"We reported it to the sheriff, but they said they didn't have any way of proving who it was," Sonka said. "We all sat around and talked about it and decided we didn't want to get in a shooting war."

Just who has a legal right to tap the ore-rich federal lands remains a muddled matter. Mining rights stem from a timeworn 1872 law that, if anything, seems to provide fertile ground for disputes over claims.

Under existing regulations, which are administered by the U.S. Bureau of Land Management, a prospector is awarded ownership of the land only if a mineral discovery is made that promises to be profitable. A miner who simply stakes a claim, meanwhile, has no more rights to the land than anyone else, be it for picnicking, target shooting or even prospecting, according to Richard Park, a BLM geologist.

"Anyone has a right to go on a mining claim as long as they don't interfere with an ongoing mining operation," Park said. "But many miners believe they've got exclusive rights to a claim. It's very difficult to convince them that this is the law because, by God, that's theirs and they're going to protect it come hell or high water."

Efforts to fundamentally rewrite the outdated law have been frustrated by elements within the mining industry, led by the influential American Mining Congress.

Matters are further complicated because the BLM lacks a centralized network to cross-check and determine if an applicant is filing for land that is already claimed. Through the years, the result has been a bevy of claim disputes that can only be resolved in civil court.

"What happens too often is the BLM doesn't concern itself with the validity of claims," said James Tweedy, one of two Los Angeles men who hired Zerbe as a caretaker for their claims. "It becomes a matter of fighting it out over who has a legitimate claim to a piece of property. Sometimes you fight it out in court. And sometimes, unfortunately, it's fought out by force."

The slayings on Memorial Day stemmed from just such a situation. Though the El Cajon family—Gustave Hudson, his wife and their two teen-age children—filed a claim, the area has been held for more than two decades by Tweedy, an attorney, and Benjamin Haimes, an import-export consultant.

Nonetheless, the BLM's Park said, the Hudsons had a right to go on the land because the current claim holders do not own the property.

On the day of the fatal shootings, investigators say, Zerbe confronted the family and demanded they leave. When Hudson showed him a copy of a county recorder's document, Zerbe left to call Haimes and report what was happening.

Within hours, however, he returned and the shooting erupted.

"There's nothing in the world worth any life," Haimes said. "Christopher was just doing his job. I feel they must have cornered him. They shot him to death."

Indeed, the slayings are not sitting well with local residents. Many were troubled that no arrests were made. Others grumbled about a cover-up when sheriff's investigators refused because of concern for the Hudsons' safety to release the names of the El Cajon family, even after they appeared in area newspapers.

Some theorized that the case was being pushed aside by investigators because of the background of the shooting victims.

Something of a loner, Zerbe looked every bit the part of a frontiersman, going barefoot much of the time and wearing his hair long, with a bandanna tied around his head. He developed a rapport with nature, to a point where he would only cut fallen timber and would chafe at shooting even a rabbit, friends and family say.

Intelligent and mechanically gifted, he made ends meet with a variety of odd jobs in the area. His first love, however, was gold mining, an avocation he picked up as a boy exploring the beehive of mine tunnels near his home.

"He didn't see things the way we might, in the spirit of compromise," said his father, Richard, an architect and amateur historian. "He was given to seeing things as either black or white."

Although his family has been a well-known and respected fixture in the community for years, Zerbe had several run-ins with the law. His father blames it on a confrontation Zerbe had with sheriff's deputies and park rangers after a traffic stop a few years ago. Ever since, police had harassed Zerbe repeatedly, the father said.

Lopes, meanwhile, was a likable old former prizefighter. His round belly and white beard made him look like a department store Santa Claus, but his face was a battlefield of scars. Townsfolk say he was the sort that always had a good word to say, leaning on a beat-up pickup along downtown's main street and chatting with whoever passed by.

"Everyone liked him. He didn't have an enemy," said Larison, a longtime friend. "He drank, sure, but a lot of people drink and you don't call them a drunk."

Larison, for one, can't believe that Zerbe would shoot at anyone.

"He is the type who might point one in the air and shoot for effect," he said. "But Chris would never point a gun at anyone. If he did, he'd hit them. He's not an expert, but he could hit someone from 100 feet with a 30-30."

After the slayings, there was much talk in Julian about retaliating against the Hudsons, who refused to comment on the incident. Richard Zerbe said he preached restraint, expressing hope that the legal process will run its course.

But the talk continues.

"I don't think it's over," Larison said. "I'm not at liberty to say what it might be, but I feel something's going to happen. I just hope it's legal."

Dee Baker, another local resident, agreed.

"It's at a slow boil right now," she said. "There are some people who say they just wish it would all go away. But others hope it doesn't go away. They want some finalization and some justice done here ... It's going to be a very edgy situation for a very long time."

Los Angeles Times

Bruce Herrington

Los Angeles Ti

Davalene Hirsch

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June 23, 1989

The Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral
  Resources Development and Production
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

Thank you for allowing me the privilege of testifying before your subcommittee on the 1872 Mining Law and S. 1126. It was a particular honor to appear together with Lynn Greenwalt of the National Wildlife Federation and with Russell Babcock, Director of Exploration of Kennecott Corporation, as representatives of a group of miners and environmentalists who have been engaged in a process of mutual education and dialogue on the 1872 Mining Law for more than a year now. It was, in my view, a most constructive hearing.

During the course of the questioning directed to our panel, Senator McClure engaged us in a lengthy colloquy on the nature and adequacy of a mineral explorer's rights before discovery of a valuable mineral deposit. While it is a most important issue, going right to the heart of the question of how the U.S. minerals industry might benefit from a revision of the mining law, it is also, as our colloquy amply illustrated, a rather complicated one, deserving of thorough and thoughtful consideration by your committee. For my part, under the pressures of the moment, I am not sure I did it justice. Please allow me to take advantage of your keeping the record open for an additional period by supplementing, with this letter, the remarks I made at the hearing.

The 1872 Mining Law states that "no location of a mining claim shall be made until the discovery of the vein or lode within the limits of the claim located." 30 USC §23. Placer claims are subject to location under the same condition. 30 USC §35. The requirement reflects the perception, basically accurate in the early days, that prospecting was little more than a matter of searching for, then claiming, minerals that could be discovered at or near the surface of the land. It was not long, however, before the practice of staking claims prior to discovery was judicially recognized, see North Noonday Mining Co. v. Orient Mining Co., 1 Fed 522, 531 (C.C.D. Cal 1880), and as exploration became increasingly involved and time-consuming, the courts evolved the doctrine of pedis possessio (literally, "foothold") to afford locators some protection against rivals during the pre-discovery period. To be protected by pedis possessio a prospector must be (1) in actual physical occupation of the ground claimed, while (2) engaging in an active, diligent search for minerals and (3) taking reasonable steps to exclude rival locators. Cole v. Ralph, 252 U.S. 286 (1920); Union Oil Co. v. Smith, 249 U.S. 337 (1919). Occupancy of part of a claim extends to the whole, but, although there is limited authority to the contrary in some jurisdictions, the established rule is that the pedis possessio requirements must be met on a claim by claim basis. See 2 American Law of Mining, 2d ed., §34.05 [1] & [2]. (Note: Compliance with pedis possessio, which is intended as a protection against third parties, creates no right against the government, nor does the government involve itself in disputes between rival locators. Until a discovery of a valuable mineral deposit is made, a claimant's possessory right with respect to the government is analogous to that of a licensee or tenant-at-will, subject to termination at any time in a government contest proceeding. Although the law might be improved by providing claimants a period of time in which their right to explore is secure even against the government, our concern, for the purposes of this letter, is the inadequacy of pedis possessio as a means of protection against rival claimants.)

Whatever may have been the merits of pedis possessio as a basis for exploration tenure in the past, it affords no real protection for claim holders today, given the way modern exploration projects are carried out. Modern hardrock exploration typically begins with regional reconnaissance over wide areas followed by detailed surface examination of identified target areas and then sequential drilling or other physical testing of the most promising targets. It is an expensive and time-consuming process, involving a systematic narrowing of focus that even in its ultimate phase is unlikely to require less than, say, ten claims, at the very least. Even if the cost were not prohibitive, it would be irrational, judged by any technical standard, to attempt to meet the requirements of pedis possessio for such a project, and virtually no one does. As for small holdings, after a certain level of prospect development has been achieved, continuous occupancy is neither helpful from an exploration/diligence point of view nor desirable as a matter of public land management policy. Under the law, however, there is no protection unless the pedis requirements are met.

How do mining companies deal with this dilemma? By and large, by honoring each other's claims even though they are legally deficient and therefore vulnerable to overstaking. It is, however, particularly in boom times, a precarious way to proceed, and breakdowns are common. See Dave W. Parkhurst, "Overstaking, Paperstaking & Claim Jumping," The Nevada Prospector, Spring, 1988 (enclosed). Sometimes armed guards and aerial surveillance are used to prevent competing entry. See Ranchers Exploration & Development Co. v. Anaconda, 248 F. Supp. 708, 712-714 (D. Utah 1965); Rocky Mountain Mineral Law Foundation, Mineral Law Newsletter Vol IV, No. 2 (1987), at 10-11 (regarding the aftermath of Amax v. Mosher, infra.) (enclosed). On-the-ground conflict, sometimes violent, can result. See San Diego Union, June 3, 1989, at B1 & B6 (enclosed); see also letter from John M. Curran, Forest Supervisor, Ouachita National Forest, to Senator Dale Bumpers, March 8, 1988 (enclosed); Memorandum from Area Manager, Folsom Resource Area, Bureau of Land Management, to the Director (3809, CA-018, 1988) (enclosed). And, of course, the case books are filled with disputes between rival locators, which can take years to resolve. See, e.g., Amax Exploration v. Mosher, Civ. R-85-162 BRT (D. Nev, Feb. 27, 1987) (concluding that neither claimant had established possessory rights in the ground in dispute) (enclosed). The cumulative cost of all this, though, to my knowledge, never measured, certainly does nothing to enhance the position of our domestic mining industry in the highly competitive world minerals market.

Public Resource Associates believes that the mining law could be substantially improved by establishing diligence, rather than pedis possessio, as a basis for exploration tenure. It is not a novel view. See Public Land Law Review Commission, One Third of the Nation's Land (1970), at 126-7; H.R. 10640, 92d Cong., 1st Sess. (1971) (Aspinall-McClure). Diligence requirements should be high enough to promote timely exploration and to discourage spurious or excessive defensive claim holdings, which are not unknown under present law. See letter from John Russell, Claim Stakers, Inc., to Reps. Nick Rahall and Larry Craig, June 17, 1987 in Oversight Hearing Before the Subcommittee on Mining and Natural Resources of the House Committee on Interior and Insular Affairs, 100th Cong., 1st Sess. 43 (1987) (enclosed). The purpose, of course, is to protect the substantial investments that are now required for exploration, while making the mining law a more efficient instrument of domestic mineral development.

In our view, the limited resources available to mining companies for exploration should go into exploring the ground, not into dealing with conflicts over the right to hold it.

The discovery test as a requirement for holding a claim should be eliminated:

- as a protection for claimants against third party rivals
- to remove uncertainty of tenure prior to discovery
- to improve the security of tenure of smaller miners in particular
- because the modern definition of "discovery," including the requirement that there be a discovery on every claim, has grown to be so complex and obscure that it has become increasingly difficult to determine when a discovery has been made
- because great changes over the decades in exploration technology now require longer prediscovery times and often very high prediscovery expenses, both of which need improved security of tenure
- to improve the efficiency and economy of the exploration process
- to reduce the risks in a very risky business.

As indicated, I have enclosed copies of those materials cited above that may not be readily available to you. If we can be of any assistance as you proceed with this matter, please do not hesitate to call on us.

Sincerely,

Putnam Livermore

Putnam Livermore

Enclosures
/rd
cc: The Honorable Dale L. Bumpers
The Honorable James A. McClure

The Nevada Prospector
Spring 1988

Overstaking, Paper Staking &Claim Jumping

... this practice of claim jumping, overstaking and paper staking is rapidly becoming a major problem for legitimate miners ... by Dave W. Parkhurst

Because of the ease with which a mining location certificate can be filed with both county and federal agencies, a number of individuals and companies have found they can obtain a recorded document that purportedly represents their ownership of a mine or claim — by expending very little physical effort or expense. Some of them do not even bother to stake the mining claims or post notices of location on the property ads required by law, and many of these people do not even take the time to check mining records to determine if the area is already covered by valid existing claims or, in fact, is even open to mineral entry.

This practice of claim jumping, paper staking or overstaking valid existing mining claims by a few profit-seeking or inattentive individuals and companies is rapidly becoming a major problem for legitimate miners, prospectors and investors in quite a few areas. As the popularity of mine ownership and mining activity increases, so does the activities of those people who seek to make a profit at the expense of others. It is tragic that the actions of a few dishonest or inept individuals and companies that engage in illegal mining activities should be allowed to create so many problems for the mining industry.

Most legitimate prospectors and miners expend their time, effort and money in an attempt to earn an honest living and/or a reasonable return from their mining ventures. A lot of hard work and careful compliance with legal and environmental requirements is being put into mining operations by serious individuals who only wish to become successful through their own efforts. Most mining operations also require some source of investment capital or outside financing in order to defray the exploration and development costs necessary to develop a producing mine. Serious investors and financial institutions are usually the primary sources of investment capital for mining development, and they are being discouraged by the large number of legal and environmental problems cropping up in the industry.

The practice of overstaking or paper staking a mining claim results in multiple filings on the same piece of mining property. Illegal activity of this type often results in litigation in the courts, involving the legitimate claim holder and the understandably infuriated investor who was unlucky enough to have purchased or invested in the property. In some cases, the legal title to the mineral rights on the claim is not resolved for several years; in others, perpetrators of this type of scam have taken off to find new hunting grounds in which to repeat the maneuver.

When coupled with the intentional claim jumping or cross-filing by certain other people, the problem is compounded. Some individuals deliberately stake over valid mining claims, remove legal papers and monuments from the properties, and attempt to establish ownership of the claims through deception. This has become a chronic problem in some areas, and it usually ties up the mining property in the courts for several years. The legitimate

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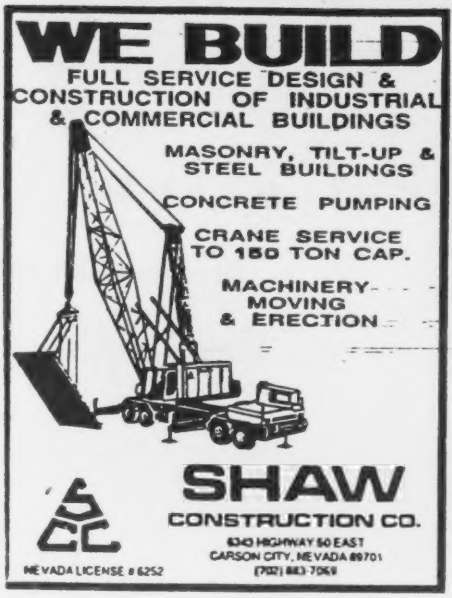
and investor have to bear the added burden of increased s, time delays, and intense frustration.

Unfortunately, there are also a large number of honest individuals who unwittingly engage in the same activities through ignorance of the mining laws or proper filing procedures, and a fewer number who have made an honest mistake. Some of these people post location notices and stake the property, fully believing that they are the legitimate owners of the claims. This also results in litigation and frustration for the legal owner of the mineral rights. A part of this problem is sometimes related to poor record-keeping practices by some county, state and federal agencies.

Many of the improperly filed mining locations (not necessarily overstaked) are also mistakes on the part of the locators; they are not thoroughly familiar with the applicable mining laws and regulations and/or are unfamiliar with the procedures involved in an adequate search of property and mining records to determine if the land is open to mineral entry, under private ownership, or has been previously claimed.

Another factor that greatly contributes to this problem is the fact that a locator will generally not be informed that he is cross-filing or overstaking an existing mining claim or claims, filing a location on private property, or is filing in an area withdrawn from mineral entry at the time that the claim is recorded. Most county recorders and the Bureau of Land Management maintain that it is the responsibility of the locator, not the agency, to determine the availability of the mineral rights on the property being located. So, having a recorded certificate of location with either the county recorder or BLM does not insure the validity or legal ownership of any mining claim.

Because of this situation, cross-filing on top of existing valid mining claims is a frequent result of an insufficient investigation of the records and an inadequate investigation on the property in the field, as is the recording of claims in areas that are withdrawn from mineral entry or on private property. In addition, some individuals and companies make a practice of staking large blocks of the public domain at one time, often ignoring the existence of private property rights or other claims in the area. Their rationale is that they are covering all of the available open ground and can straighten out any potential conflicts at a later date, but this type of activity can also create some headaches for the unsuspecting claim owner. For one thing, it clouds the prior locator's title to the mineral rights on his property, and nothing can be done with the claim until the problem is legally resolved.



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Another type of overstaking or cross-filing results from the requirement to file annual assessment work to maintain a valid mining claim. The regulations state that an affidavit of labor or notice of intent to hold must be filed and recorded each year with both the county recorder and the BLM. If these documents are not filed within a specified time period, the claim is declared to be invalid and the ground is open to relocation by another party. A large number of individuals and companies desiring a particular area of mining claims are constantly checking records to determine if they have lapsed or have been declared invalid for failure to properly file the annual assessment work. Since mining records are often not quite up to date or errors occur during the recording of documents, this type of activity can often result in someone overstaking a valid existing claim because they believe the location has lapsed. This creates an additional burden on the legitimate claim holder, since he must prove that the proper documents have been filed on time. It also clouds the title to the claim until the relocator files a quitclaim, legally relinquishing any rights to the property.

So, if anyone is in the process of purchasing a mining claim, or is planning to purchase one in the future, the legal status and ownership of the mining property should be thoroughly checked to insure that the purchase is being made from the legal owner and that the claim is, in fact, a valid mining location.

It seems strange that the appropriate governmental agencies are reluctant to take any action that would greatly reduce, or eliminate, some of these problems. Most of the state, local and federal agencies have already specified penalties for the fraudulent filing of mining location certificates and other documents. These penalties are normally cited in the agency's regulations and/or on the particular mining document itself, yet it is very seldom that the penalties are applied or the regulations enforced — even when it is obvious that something wrong is taking place.

For example, in the BLM 43 CFR 3833 regulations entitled "Recordation of Unpatented Mining Claims," Section 3833.5 "Effect of Recording & Filing," paragraph (g). It states: "Any person who files an instrument required by these regulations knowing the same to contain any false, fictitious or fraudulent statement or entry, may be subject to criminal penalties under 18 U.S.C. 1001."

In Nevada, the Nevada Revised Statutes (NRS) 517.300 "Unlawful Acts; Penalties," stipulates: "(1) Every person who willfully antedates or puts any false date or date other than the one on which the location is made upon any notice of location of any mining claim in this state shall be punished by imprisonment in the state prison for not less than 1 year nor more than 10 years, and may be further punished by a fine of not more than $10,000;" and "(2) Every person who willfully and knowingly makes a false material statement on the certificate of location or on any map

CONTINUED on Page 39

NMPA NEWS

MOTHER LODE MINERS: As usual, we see a lot of active leadership coming out this organization. The following is reported via their monthly newsletter.

□ Our total Association has taken a firm stand against the recreational use of mining claims by "mining clubs" who use these claims for the exclusive use of their members. This is a violation and misuse of the intent of our mining laws, and unfortunately, is growing very rapidly. The February issue of the California Mining Journal printed one of our editorials on this subject, and we see this problem heating-up rapidly.

We oppose "recreational" claim staking primarily because both the recreationalist and the professional miner get hurt. The recreationalist loses because territory for panning, sluicing, and dredging is being removed from their use, and with not enough areas available now, this situation compounds the problem beyond reason. The professional loses because this "claiming process" eventually will start taking in lands which contain hard rock and underground placer deposits (which the recreationalist will not be interested in developing). This greatly restricts the potential for significant mining operations.

The second reason for our opposition is that this misuse of mining claims, and removal of land for recreational use, will result in a very angry public. This anger and dissatisfaction will be translated into political action. You can be assured this political action will not be for mining, and the result will be an attack and then drastic changes to our mining laws, which we have fought to preserve.

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We will continue our efforts to stop any misuse of mining claims before the problem is beyond a reasonable solution. We are asking every mining organization to refrain from the practice of "recreational" claim staking, and to work, as we are, to stop any activity that will jeopardize our mining rights.

□ The U.S. General Accounting Office (GAO) is starting a survey concerning the 1872 mining law patent provision. The purpose, as stated, is "We want to determine the need to revise or repeal the patent provision". The GAO has selected the Pacific Southwest Region of the Forest Service for this review, along with field work to be done at BLM in Sacramento. This survey will begin shortly. At this time we do not know the scheduled completion date. (Our thanks to the Forest Service Minerals group for providing us this information).

□ The Federal Mine Safety and Health Administration (MSHA) has been enforcing their regulations of 1977 against every small miner. These regulations were developed for the coal mining business, and later modified with the addition of three words . . . "and other mines". This three word edition opened the doors for the MSHA inspectors to go after every small miner. The regulations were designed for large operations, and included items that made absolutely no sense to the one man operation. Several small miners have been shut down in the Mother Lode of California because of this, and a large number of others fined because of "violations".

In 1987 the Mother Lode Miners proceeded to stop this, and went to Congressman Shumway for help. The result was bill HR—1042, which is currently in the Subcommittee on Health and Safety. The problem is that the is simply sitting there. We need your letters to the Chairman urging him to bring the bill up for consideration and approval. Send the letter to: Chairman Joseph M. Gaydos,

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[illegible] Continued from page 13

required by this chapter shall be punished by imprisonment in the state prison for not less than 1 year nor more than 10 years, and may be further punished by a fine of not more than $10,000."

Another example is the penalties printed on the back of most mining claim location notices and certificates in California, which states: "Any person who willfully makes a false statement with respect to any mining claim on the posted location notice or on the recorded notice shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine not exceeding one hundred dollars ($100) or by imprisonment in the county jail not exceeding six months, or by both such fine and imprisonment." (Public Resources Code of California, Sec. 2315).

Since it is evident that most governmental agencies are not adequately enforcing these regulations, it is becoming necessary for legitimate miners to police the regulations themselves. Any cases of proven illegal mining entry or falsified documents should be reported to both the BLM and the appropriate state agency, accompanied with corroborating evidence of same, by anyone who is aware of the situation. It is only by taking action against such illegal mining activities that we can expect to curtail or prevent such actions. This would be a great help in reducing some of the headaches encountered by the honest miner and prospector, since we have enough to contend with as it is.

However, please keep in mind that honest mistakes are sometimes made by both the beginning prospector and the experienced miner. Care should be taken to insure that these people are made aware of the situation, and that they be given an opportunity to correct their problem. In addition, all miners and prospectors should refrain from any activities that could add to the problem. □

MISSISSIPPI—OIL AND GAS

(John Land McDavid, Reporter)

Legislation

The 1987 Mississippi Legislature passed three bills, all approved by the Governor, intended to encourage additional oil and gas drilling.

Severance Tax Exemption—New Wells

Senate Bill No. 2111 amended Miss. Code Ann. §§ 27-25-503 and 27-25-703 (1972) to allow an exemption to the 6% (of value at point of production) severance tax on oil and gas. The exemption on oil provides that oil produced from a well for which drilling is commenced after March 15, 1987, and before July 1, 1988, shall be exempt from severance taxes if the average value of oil for the month, as determined by the State Tax Commission, does not exceed $25.00 per barrel. This exemption will apply to the first 50 barrels of oil removed from the ground in each day from wells drilled to a depth of 12,000 feet or less and will apply to the first 100 barrels of oil removed from the ground in each day from wells drilled to a depth greater than 12,000 feet below the surface. The oil exemption will extend until June 30, 1990. Natural gas and condensate produced from any wells for which drilling is commenced after March 15, 1987, and before July 1, 1988, will be exempt from the 6% (of value at point of production) severance tax for a period of two years beginning on the date of first sale of production from such wells.

Risk Compensation Requirements Reduced

Miss. Code Ann. §53-3-72(2) (1972), provided for the forced pooling of drilling units and allowed operators and other expense-bearing interests to recover out of production, if any, 250% of cost from non-consenting owners. The statute previously required owners of a majority of drilling rights to agree to the drilling of the well before a petition could be filed with the State Oil and Gas Board requesting risk compensation (or "risk penalty") charges against non-consenting owners. Section 53-3-72(2) was amended by Senate Bill No. 2774 to require the owners of only one third of drilling rights to agree to the drilling of the well before risk compensation charges can be requested.

Compulsory Fieldwide Units

House Bill No. 101 reduced from 85% to 75% the approval of royalty owners and working interest owners required in order to form a compulsory fieldwide unit under Miss. Code Ann. §53-3-107 (1972).

NEVADA—MINING

(Richard W. Harris, Reporter)

Pedis Possessio—Discovery

In *Amax Exploration, Inc. v. Ross Mosher*, the Federal District Court of Nevada issued a Memorandum Opinion concerning disputed claims in the vicinity of Amax's Sleeper Mine in Humboldt County, Nevada. The opinion is important because of its treatment of *pedis possessio* and mineral discovery issues.

Ross Mosher and other defendants had located a series of association placer claims on alluvial gravels adjacent to the Slumbering Hills. John Wood, a geologist for Amax, inferred that the gravels overlay a buried pediment with gold-bearing ores. Wood staked lode claims and some placer claims over the existing association claims. The Moshers objected to the overstaking and Amax commenced a quiet title action in Federal District Court. Following the trial, but before the court had rendered a decision, Amax entered into a settlement agreement with the Moshers to secure title to its Sleeper Mine. However, the peripheral claims remained in dispute. On March 2, 1987 Judge Thompson issued his Memorandum Opinion. He ruled that the senior and junior claims were both "procedurally proper" but that neither the Moshers nor Amax had made a discovery of valuable minerals or satisfied the requirements of *pedis possessio*. The court also ruled that the "dual staking" of both lode and placer claims by Amax did not constitute an abandonment of either claim group.

Amax presented evidence that its geologists had conducted shallow pit sampling, biogeochemical and geomicrobial sampling, resistivity/inverse-polarization geophysical testing, ground magnetic testing, and gravimetric testing on the disputed property. Although gold was detected in several samples, the court found that Amax's efforts demonstrated only a "promising potential for exploration" that fell short of a legal discovery on each Amax claim. Similarly, the "haphazard operation" of the Moshers, and questionable assay techniques did not constitute a discovery of minerals sufficient to satisfy the "prudent man" test:

> Defendants note correctly that courts typically view the evidence of discovery more in favor of the senior locator in a dispute between rival claimants. That advantage is of no aid to defendants on the GR claims. Under any view of the evidence, they have failed to prove credibly, with respect to each particular claim, placer mineralization which would lead a reasonable and prudent miner to conclude that there is a reasonable prospect of developing a profitable mine. . . . The advantage of being the senior locator cannot displace the need to prove the elements of discovery.

Judge Thompson next ruled that neither party had satisfied the requirements of the doctrine of *pedis possessio*:

> No party has occupied the claims in dispute actually, physically and continually. Amax has an operation of exclusion over the entire area under the guise of its Sleeper Project, but that alone does not equate to claim-by-claim occupancy. . . . Assessment work and sampling on the claims in dispute have not brought the parties to the claims with the frequency of an occupation.
>
> Diligent, bona fide work directed toward making a discovery on each claim is not the case either. The Amax sampling subject area was admittedly geared toward initial claim validation. . . . Other than a general enthusiasm to explore the subject area further, no plan was put before the Court to permit it to find reasonable likelihood of near future development of each subject claim. . . .
>
> Amax seeks to have the doctrine extended to recognize the realities of modern day practices in Nevada's gold mining industry. The Court recognizes these realities, but does not think that the doctrine should in this case afford Amax relief. . . . The doctrine favors the prospector in actual possession, protecting him against forcible clandestine or fraudulent intrusions by others so that he may continue to prospect the area of possession diligently.
>
> There is a great difference between this and recognizing some right short of discovery to support contiguous, unoccupied claims located solely upon geological inferences and an areawide program of exclusion.

The court then held that "the land remains in the public domain open to peaceable exploration by the parties or by any other citizen." This Delphic declaration led to additional controversy. Amax, taking the position that it could validate its claims by making the first discovery, commenced a program of mechanized sampling and drilling on the claims; it also posted armed guards in the contested area with orders to exclude any other party attempting to sample or make a discovery. The Moshers felt that the court had declared all claims to be void, and they proceeded to relocate the contested ground with placer and lode claims. A confrontation between the parties was temporarily resolved when Amax and the Moshers' lessee agreed to conduct a joint drilling program in the contested area.

The *Amax* case suggests that the doctrine of *pedis possessio* in Nevada will be given a restrictive interpretation (at least in the federal courts). Judge Thompson's decision is also noteworthy because of its ruling that the senior locator must demonstrate a "prudent man discovery" in order to uphold his claims against a rival locator.

The Memorandum Decision will not be published in the Federal Supplement. Copies can be obtained from the Federal Court Clerk in Reno (Case No. R-85-162-BRT) or from this reporter.

NEW MEXICO—OIL AND GAS

(John S. Nelson, Reporter)

Oil & Gas Leases-Dry Hole, Additional Drilling & Pooling

In *Owens v. The Superior Oil Company*, 26 St. B. Bull. (1987), the New Mexico Supreme Court held that a well commenced on pooled acreage after the expiration of the primary term of an oil and gas lease was sufficient to hold the lease in effect under the dry hole, additional drilling, and pooling provisions of the lease.

The lease provided that if the lessee drilled and abandoned a dry hole, the lease would not terminate if the lessee commenced additional drilling operations within 60 days thereafter. The same paragraph also provided that if the lease was not producing at the end of its primary term, but the lessee was then engaged in operations for the drilling of a well, the lease would remain in force so long as "such operations or said additional operations" were commenced and prosecuted with no cessation of more than 60 consecutive days. If such operations resulted in production, the lease would remain in effect for so long thereafter as production was obtained from the leased lands or lands pooled therewith.

The lessee was engaged in drilling operations at the expiration of the primary term of the lease. These operations resulted in a dry hole. Three days later, the lessee commenced drilling operations on a new well which was not located on the leased lands. Eleven days later, the lessee filed a designation of pooling pursuant to the pooling provision of the lease. The pooled area included the well location as well as lands covered by the lease. The subsequent drilling operations resulted in a producing well on the pooled area.

The mineral owners sued to obtain a release of the lease, claiming that the lessee's actions had not maintained the lease beyond the expiration of its primary term. The court held that the effect of drilling the dry hole was to maintain the entire lease in effect, including the pooling provision, for a period of 60 days thereafter. Because a portion of the leased lands was properly pooled during the 60-day grace period, and because drilling operations were commenced on the pooled area during the 60-day grace period, and because the drilling operations were continuously conducted and resulted in a producing well, the lease did not expire.

This case appears to be the first reported decision in New Mexico which deals with the interaction of the pooling and dry hole/additional drilling provisions of an oil and gas lease after the expiration of the primary term. The case provides clear authority that in a proper case the pooling power may be exercised after the expiration of the primary term of the lease, and that the lease may be maintained by operations conducted on the pooled area, even though they are not conducted on the lands covered by the lease.

Farmout—Acreage Contribution—Subsequent Operations

In *Harper Oil Company v. Yates Petroleum Corporation*, 733 P.2d 1313 (1987), the New Mexico Supreme Court reviewed a trial court's construction of an operating agreement which was held to be ambiguous. The supreme court's review was based upon a challenge to the sufficiency of the evidence. The court affirmed the trial court, holding that the evidence was sufficient to support the trial court's construction of the agreement. While the decision does not announce any new legal principles, it illustrates the fact that care should be taken in the drafting of operating agreements to avoid subsequent disputes.

Harper involved the typical situation in which an operating agreement is circulated by the operator to the non-operating participants in a well. Phillips Petroleum Co., one of the non-operators, insisted upon an amendment which provided that with respect to wells drilled after the initial well required by the agreement, Phillips could elect either to participate or to assign its interest to the operator, reserving an overriding royalty interest. It appears that the agreement was prepared on some version of the AAPL Form 610 Model Form Operating Agrement.

The initial well was drilled. Phillips elected not to participate in subsequent wells and assigned its interest to the operator pursuant to the amendment. Harper Oil Company, also a non-operator, claimed that the operating agreement gave it the right to share pro rata in the interest which Phillips assigned to the operator pursuant to the amendment. Harper's claim appears to have been based upon Article VIII(C) of the operating agreement, which dealt with acreage (and cash) contributions, and upon Article VI(B)(2), which dealt with subsequent operations by less than all parties.

The supreme court affirmed the trial court and held that the Phillips amendment was ambiguous when read in connection with the provisions of the operating agreement referred to above. The trial court held that neither of these provisions gave Harper a right to share pro rata in the interest assigned by Phillips to the operator. Based upon evidence that the acreage contribution provision would apply only when a person not a party to the operating agreement made an acreage contribution, the supreme court held that there was sufficient evidence to support the trial court's conclusion. With respect to the provision of the operating agreement relating to nonconsent operations, the trial court and the supreme court both held that the Phillips amendment removed Phillips' interest from the operation of the provision, and that the amendment did not inure to Harper's benefit.

NORTH DAKOTA—OIL AND GAS

(Jane Fleck Romanov & Owen L. Anderson, Reporters)

Pipelines—Ad Valorem Taxation

In *Phillips Natural Gas Company v. State Board of Equalization*, 402 N.W.2d 906 (N.D. 1987) the Supreme Court of North Dakota held that pipelines are subject to central ad valorem tax assessment by the State Board of Equalization. The court construed article X, section 4 of the North Dakota Constitution to authorize "central assessment of linear transportation systems ordinarily extending through multiple geographic taxing districts." The court reversed the trial court which had held that the pipelines were subject to local ad valorem assessment. The court rejected the pipeline owners' arguments that the oil and gas pipelines were personalty and thus subject to certain statutory exemptions.

San Diego Union
B - 1 & 6
June 3, 1989

Mine site gunbattle is detailed

Official says family claims 2 men shot after opening fire

By Pauline Repard
Staff Writer

JULIAN — Both sides had brought small arsenals to the peaceful, wooded canyon off State 78.

When the gunbattle that left two men dead on Memorial Day was over, sheriff's deputies collected no fewer than nine firearms and a supply of ammunition.

An AK-47 semiautomatic assault rifle, a .22-caliber rifle, a 9.2mm rifle, a 12-gauge shotgun and 9mm pistol all belonged to the El Cajon family and friends who had come to the site to explore and target shoot.

Two 12-gauge shotguns and two rifles were found near the two Julian residents killed in the hail of gunfire.

In their first detailed accounting of the shootout, sheriff's investigators yesterday told how a confrontation of words later erupted into shots from the two Julian men who apparently thought they were guarding the mine from claim jumpers.

The story, based on interviews with the family, also tells how family members scrambled in terror after the men began shooting at them and then returned the fire with a shower of bullets that instantly killed Edward "Joe" Lopes, 66, and mortally wounded Christopher Zerbe, 34.

Out of concern for the family's safety, officials still will not release the last names of those who survived the encounter on a dirt road six miles east of this community just outside of Banner.

Lt. John Tenwolde identified members of the group only as Gus and Mary, both 41, and their children, Matthew, 20, and Heather, 16. With them were friends Roberto, 19, Todd, 24, and Brandy, 14.

The family, reached at their rural home yesterday, declined to discuss Monday's incident but said a spokesman would release a statement of their version of the events soon.

Gus and his companions told investigators that Zerbe began the gunfight, and they returned fire in self-defense. No one has been arrested or charged in connection with the deaths, and Tenwolde said evidence collected so far tends to substantiate the family's story.

Zerbe died of multiple gunshot wounds — two to the head and one each in the chest, right foot and knee. Lopes was shot once in the head and once in the chest.

Tenwolde said Gus had filed a placer and lode mining claim with the county recorder's office on May 19 and had visited the area several times prior to the holiday outing. County records show that he filed that claim and nine others in the name of Inspiration Mining Co.

But Encino resident Benjamin Haimes maintains he holds the site's only valid mining claim, registered with the Bureau of Land Management — and that he had hired Zerbe to keep watch over his land.

Tenwolde said he isn't sure who is right.

"We're still trying to track the ownership of the claim, and it's difficult — it's confusing," said the sheriff's lieutenant. "I'm not satisfied with anything as it regards that property."

Tenwolde related that Gus and his wife, with 10 family members and friends, took several vehicles to the remote mine site to picnic, target shoot and explore.

Their son Matthew, 20, and his 19-year-old friend, Roberto, arrived first at about midday and were confronted by two men in a pickup who demanded that they leave. Matthew and Roberto, who later identified the men as Zerbe and Lopes, moved away from the gate barring a dirt road to await Gus and the others.

Gus arrived in his motorhome and also encountered Zerbe and Lopes at the gate. He told deputies the pair were profane and belligerent, demanding that the group leave. Gus said he showed Zerbe his claim documents and the younger man reluctantly conceded that Gus was entitled to be there.

Zerbe and Lopes left while Gus' family unlocked the gate and headed up the dirt road a quarter of a mile to a clearing near a narrow, muddy creek.

Five members of the party left at 6:30 p.m., leaving the couple, their children, Matthew and Heather, and friends Roberto, Todd and Brandy.

The young people took several guns up the canyon to target shoot while Gus and Mary stayed near the

Holiday: Officials detail fatal shootout at mine site

stream, their AK-47 rifle laying nearby.

Shortly before 7 p.m., Gus noticed that someone had driven up the dirt road, to an elevated area across the stream, near a cabin. Trees obscured his view, but Gus heard a man curse and yell, "That's not placer," as Mary was picking up debris.

The barrel of a gun protruded from the pickup window and a shot was fired in Mary's direction, according to the deputies.

She screamed, flung her arms across her chest and ran toward the motorhome, parked about 70 feet away and out of sight from the pickup. Gus told deputies he initially thought Mary had been shot. He said a man in the truck shouted something like, "I'm gonna kill you!" and "I killed him!"

Gus grabbed his assault rifle and moved behind a tree for cover. The three young people, meanwhile, had returned. Todd stayed 300 to 400 feet away on a hillside and watched while Brandy and Heather got to the motorhome. Matthew and Roberto, still carrying their guns used in target practice, took cover near the stream.

The pickup backed up a short distance, and one of the two men inside it yelled something about "dying" before a second gunshot was fired from the men's direction, according to Tenwolde. Roberto told deputies that he heard a bullet whiz past him.

Then, the family and their friends opened fire — Roberto, Gus, Matthew and Todd all shooting simultaneously.

The truck driver's door suddenly swung out and a man holding a rifle fell to the ground. Gus said he yelled to his companions to stop shooting, which they did.

They agreed that the exchange of gunshots lasted only "a matter of seconds," Tenwolde said.

As Gus and Roberto neared the truck, they realized it was the same pickup they had seen in the confrontation at the gate. Then they saw the two men.

Inside the pickup was Lopes, shot. A double-barrel, 12-gauge shotgun was next to him. Another shotgun and rifle also were in the truck.

Zerbe, who was outside the pickup, was still alive, and Gus kicked away the rifle that was in, or near, his hand, he told deputies. Matthew and Roberto went out to the main gate, at the highway, to get help, while Mary covered Zerbe with a blanket.

Deputies received the call at 7:31 p.m. and arrived in a sheriff's ambulance 28 minutes later. Finding Lopes dead but Zerbe still alive, they rushed Zerbe to the Banner Store parking lot to be picked up by Life Flight helicopter, but a doctor who arrived in the helicopter said Zerbe was dead.

Tenwolde said the investigation is continuing, into the shooting as well as the property rights.

"But the real issue is the death of two men," he emphasized. "Trespassing doesn't justify the use of deadly force. You don't have the right to shoot at trespassers."

United States Department of Agriculture
Forest Service
Ouachita National Forest
P. O. Box 1270
Hot Springs, AR 71902
Caring for the Land and Serving People

Reply to: 2300

Date: March 8, 1988

Honorable Dale Bumpers, U.S. Senate
Washington D.C. 20510
ATTN: Debra Merrick

Dear Senator Bumpers:

We are pleased to be able to provide you with additional information as you have requested on the quartz crystal situation we are currently facing on the Ouachita National Forest in Arkansas. We are enclosing a videotape and three "Briefing Papers" on this subject developed in response to your request by our Forest Minerals Geologist, John Nichols, plus a variety of other materials relevant to your inquiry.

As you noticed from our discussion, hardrock mining procedures on federal lands can be complicated and challanging for the mining public, land administrator, and legislator alike. You are raising important questions regarding hardrock mining on public domain status lands. Through your search, you may find that the laws affecting hardrock mining on the public domain in todays society might in reality be doing less to encourage valid exploration and development of the nations mineral resources than they possibly did in the past.

Some contend that the government is moving to lock the lands up and make them inaccessible to the miner, thereby indicating a position of indifference toward mineral resources by federal land managing agencies. As you are aware, this is certainly not the case with this agency and the Ouachita National Forest. Minerals is one of the many resources this agency manages for and as discussed with you, we on the Ouachita National Forest take our charge for the mineral resource very seriously.

Unfortunately, it has been discovered that many people often do not realize that to protect other equally or more valuable surface resources, the 1872 Mining Law with its provision for patenting away of the surface with the mineral estate, will always pose a real threat to sound resource management as long as there is the potential for loss of control of the surface estate. This is simply because of the provision in that law which allows for the patenting out of the surface estate along with the mineral estate. While it is true that patents are not easily issued, it is important to remember that patents, in fact, are issued on a regular basis. The law has not changed in over 100 years, consequently the federal land manager must consider the potential that such an action offers -- i.e. the loss of valuable surface resources that the public expects and demands to have protected. A real example of the effects of this situation can be found right now on the Ouachita National Forest. Lake Winona, in the northeast corner of the Forest, is an extremely important resource not only for its' recreational, esthetic, and other values, but primarily because it provides 23 million gallons of fresh drinking water daily to the City of Little Rock, twenty miles away. The National Forest lands adjacent to Lake Winona are "public domain" status lands open to mining claim location under the 1872 Mining Law. At the request of the City of Little Rock to protect the watershed, the Forest is pursuing a withdrawal from "locatable" mineral entry for these lands. The 1872 Mining Law allows us virtually no choice but to outright remove the lands from total mineral entry for all "locatable" minerals, even though it is recognized that a well controlled minerals exploration program and low level mining activities could be conducted in such a way that they would have virtually no impact to the water quality or other valuable resources in that area.

For the most part, existing Federal regulations governing reclamation of all "locatable" mining operations on public domain lands do insure appropriate protection for other important resources, except that they do not apply to lands that are patented away. However, for now the result will be the removal of several thousand more acres of federal public domain lands from any kind of "locatable" mineral entry.

In other parts of the Forest where high surface values are present on "acquired" status lands, which are not subject to the 1872 Mining Law, exploration and low level mining activities are able to occur because the threat of potential loss of the surface estate is removed. The land manager often has to make this type of a choice fully recognizing that some low level mining activities could very well take place without impacting other resources. In this way the 1872 Mining Law, with its ever present threat to surface resources, causes the total removal of lands from mineral entry so that even exploration for a valuable mineral deposit is prevented.

Another observation we have been able to make as a result of this present quartz crystal "rush" we are experiencing, is the increase in the potential for violent confrontation situations between "rival claimants". The 1872 Mining Law does little to discourage such situations. Intimidation through rival claimant type situations, and speculation also effectively discourage exploration and development of potentially valuable mineral resources thereby producing a withdrawal like effect on the mineral resource.

Again, we appreciate your contacting us on the situation we are dealing with here. Please let us know if we can be of further assistance.

Sincerely,

/s/ John M. Curran
JOHN M. CURRAN
Forest Supervisor

cc: Honorable David Pryor, U.S. Senate; Washington D.C. 20510
Honorable John Paul Hammerschmidt, U.S. House of Representatives; Wash.
Honorable Tommy Robinson, U.S. House of Representatives; Washington D.C
Honorable Beryl Anthony, jr., U.S. House of Reps.(ATTN: Tom Ellsworth)
Honorable David Pryor, U.S. Senate (ATTN: Carmie Henry; L.R., AR)
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June 26, 1989

The Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral
Resources Development and Production
United States Senate
Washington, D.C. 20510

Re: June 7, 1989 Hearing on the 1872 Mining and S.1126

Dear Mr. Chairman:

In response to your letter of June 14 requesting answers to a set of additional questions relating to the June 7, 1989 hearing on the Mining Law of 1872 and S. 1126, I submit the following, for the record.

Please understand that, at this time, I am unable to speak directly for the participants in the Mining Law Dialogue, who are still hard at work on the issues your Committee is studying, including some of the questions you have put to me. It is our hope that before long the Dialogue will be able to speak directly and comprehensively on the issues and that this will be a help to you and to the process of mining law revision generally. For now, what I can do, as Chairman of the Dialogue, is give you my own best sense of the Dialogue's current thinking on these questions.

1. How does the Mining Dialogue define "self-initiation?"

Self-initiation is the right to locate mining claims on the open (unappropriated and unreserved) federal lands without prior notice or governmental approval.

Subject to the terms and conditions of the law, including surface management and environmental protection requirements, locators of mining claims should have the exclusive right to explore for, develop and mine mineral deposits within the boundaries of their claims and to use so much of the surface as is necessary for those purposes. In addition, except as otherwise limited by law, mining claimants should be permitted to use available federal lands outside the boundaries of their claims to the extent necessary for access to their claims or for operations incident to mineral exploration, development and production on their claims.

2. Does the Mining Dialogue think the government should be able to decide whether a given area is used for mining?

The government's authority to determine the use of property belonging to the United States is fundamental. See U.S. Const., art. IV, §3, cl.2. That this authority extends to decisions concerning where mining should or should not take place is beyond question. How this authority is exercised, however, can have serious implications for the incentive to explore and mine on federal lands, which turns on the expectation of a right to mine discovered deposits. To be able to proceed with some measure of confidence, miners need to know in advance what the limits are.

Section 204 of the Federal Land Policy and Management Act (FLPMA), which governs withdrawals, represents a carefully crafted approach to making these decisions fairly, with due regard for the various competing interests involved. The Dialogue participants recognize, however, that there are important nonmineral resources and values on unwithdrawn federal lands that warrant protection. The participants also recognize that, once the question of retention of these lands in federal ownership is resolved, mining, if carefully constrained, might be an acceptable subordinate use on some lands that have previously been withdrawn to serve other primary purposes. The question becomes how to protect nonmineral resources and values, short of withdrawal, without placing so much discretion in the land managers' hands that the incentive to come on the federal lands to explore and mine would be destroyed.

The existing surface management regulations of BLM and the Forest Service do provide a significant measure of protection, although the statutory authority to minimize adverse environmental impacts might be clarified. As they are, these regulation, in conjunction with environmental laws of general application, such as the Endangered Species Act, can be used as a basis for prohibiting mining in some areas.

The Dialogue, however, has been studying ways to use the land planning process to create a means, supplementary to and more flexible than withdrawal, to improve on the protection afforded nonmineral resources. Because of the collision of values that occurs just below the surface of this issue, it is the hardest task we have set for ourselves. Miners fear that land use planning would be used to create de facto withdrawals, further limiting their access to federal lands. Environmentalists fear that unless mining is fully integrated with the land use planning process its historical dominance in conflicts among competing resource values on unwithdrawn lands will make it impossible to protect environmentally sensitive areas.

In our discussions, we have established that both miners and environmentalists could benefit from a planning regime that, as an alternative to withdrawal, imposes upfront, site-specific constraints on exploration and mining to protect specific, well-defined resources identified in a process that is fair and objective. Restrictions or conditions on mineral exploration and development, including, if indicated, prohibitions on certain types of activities (short of outright prohibitions on exploration or mining), could be provided in land use plans where important nonmineral resources and values, such as, for example, endangered species habitat, archaeological sites or ACEC's, are identified as warranting special protection. The plan amendment process could be used to remove or revise restrictions, conditions or prohibitions under appropriate circumstances, as where, for example, an acceptable mitigation proposal is developed. Where general outright prohibitions on exploration and mining are contemplated, however, the withdrawal process, set forth in FLPMA, should be invoked. Presumably, though, given a flexible planning-based approach to imposing site-specific restrictions, the need to resort to withdrawals to protect sensitive resources would be significantly reduced.

3. Please clarify why the Mining Dialogue supports changing the valid discovery test, and any revision suggested to the test.

In my letter to you, dated June 23, 1989, a copy of which is attached, I discuss this question at some length. To summarize, the mining law, as written, leaves miners with no protection from rival locators during the exploration phase of the mineral development enterprise. The protection afforded by the judicially created doctrine of pedis possessio, which is the sole basis of pre-discovery tenure under current law, is inadequate for modern exploration projects. Compliance with pedis possessio requires continuous physical occupation of the ground in conjunction with an active, diligent search for minerals and the exclusion of rival locators--all of which, though they may have been feasible in the past, are impracticable and inefficient requirements when applied to the large areas and sequential drilling programs that are typically involved in today's exploration projects. Even for small holdings, after a certain level of prospect development has been achieved, continuous occupancy is counterproductive, both from mineral development and a public land management perspective. Because a secure basis for exploration tenure is lacking, disputes between rival claimants are commonplace, generating substantial legal and other transaction costs that reduce the funds available for the real work of exploring the ground. To add to the uncertainty, claimants can never be sure of the legal sufficiency of their claims until they have been tested in administrative proceedings or in court, because of the confused state of the modern discovery requirement, as now applied, including the current requirement that there be a discovery on each claim.

Please note that the issue is eliminating the discovery requirement and its weak substitute, the doctrine of pedis possessio, for purposes of establishing a claimant's right against third parties, which we believe should turn on compliance with location, diligence and filing requirements. With respect to the government, we have discussed retaining a modified discovery requirement as a prerequisite for a mineral patent. For unpatented claims, we have discussed a fixed time limit on exploration tenure, after which a claimant must apply for patent or develop an operating mine.

As for what the discovery test for a mineral patent might be, it should be noted that it is impossible to divorce the concept of mineral ore from the notion of economic value. There is no other way to distinguish ore from other minerals in the ground. However, present marketability, given the wide fluctuations that metal prices are subject to, should not be controlling. We think that a "valuable mineral deposit" is one of sufficient quantity and quality that there is a reasonable likelihood that a paying mine can be developed for the mineral(s) in question, taking into consideration historic price and cost factors and reasonable assumptions about future trends. See In re: Pacific Coast Molybdenum Co., 75 I.B.L.A. 16, 29 (1983). In applying the test, all claims overlying the deposit should be aggregated, and geological inference should be acceptable in delimiting the full extent of the deposit.

4. What does the group propose as "a true diligence requirement?"

Mining groups, such as the Minerals Exploration Coalition, are likely to be the best source of information as to the appropriate level at which to set work requirements in order to achieve real diligence in proving up claims. In principle, work requirements should be set at levels high enough to promote timely exploration and development, to discourage spurious or inordinately monopolistic or defensive claim holdings and to promote turnover. Levels should not be so high, however, that they become a burden for responsible explorationists, adversely affecting the way they go about their business. We have discussed increases in the magnitude of double the existing requirements, escalating by a factor of two at, say, five year intervals. To provide miners with reasonable latitude in determining how to implement their exploration and development programs, as well as to avoid forcing inappropriate make-work, in-lieu payments might be permitted. Work on one portion of a claim block, which is reasonably limited in extent and compact in shape, should be applied to meet the requirements for the block as a whole, and a reasonable carry-forward period should be provided. The definition of qualifying expenditures should be expanded to take in any activity reasonably related to the effort to explore for, develop or mine mineral deposits, or to reclaim land disturbed by exploration or mining activities, including the gathering of environmental baseline data and obtaining required permits or approvals. Work records should be subject to government audit for a fixed period of time, perhaps five years.

5. What is the definition of a "small miner?" Please quantify the role the small miner plays in mineral development.

We have made no independent effort to define a "small miner" or quantify his role in mineral development. Relatively recent examples of attempts to do so are: David W. Delcour and Diane D. Rees, "The Role of the Small Miner" (paper presented at the 1977 American Mining Congress Convention, Sept. 13, 1977) and Congress of the U.S., Office of Technology Assessment (OTA), Management of Fuel and Nonfuel Minerals in Federal Land: Current Status and Issues (1979) at 67-75. Delcour and Rees, while describing the small miner's role in exploration, define a small miner in terms appropriate for describing small-scale producers ("an individual, partnership or corporation which is not listed on a major stock exchange; or which has a capitalization of less than $1,000,000; or which employs fewer than 50 persons; or which produces less than [50,000 to 200,000 tons annually]"). The Alaskan placer miner and other small producers, often working marginal mines large companies would find uneconomical or developing minerals like garnet, graphite or mica for which there is a limited demand, do still play an important role in the industry, but it is the prospector-explorationist one normally is referring to when using the term small miner. For its part, OTA estimates that the small miner, when defined as an individual prospector or explorationist, is likely to spend less than $10,000 per year on exploration, which is putting too low a ceiling on the category to our way of thinking. A threshold production figure below $500,000 or $1 million in gross proceeds could better serve as a definition. Again, the Minerals Exploration Coalition might prove a superior source of data for developing a small miner profile. In this connection, I would direct your attention to the testimony of Geoffrey Snow at the June 7 hearing in which he describes the significant structural change that has occurred in the mineral industry as a result of its generally depressed condition throughout the 1980's. Responsibility for what Mr. Snow called "generative exploration work" has shifted from the in-house exploration divisions of major producers, which have experienced sharp cutbacks, to individual explorationists, with as yet unknown consequences for the industry as a whole.

The uranium boom of the 1950's is frequently cited as being, still, the best example of the importance of the entrepreneurial drive that small miners and prospectors, collectively, bring to the mineral development enterprise. There, by sheer force of numbers and with the help of the Geiger counter, individual private prospectors, who made major discoveries, were able to meet a critical national need for a strategic resource while the government's own exploration program foundered. However, until remote detection of other minerals becomes practicable (a possibility it would be presumptuous to rule out), the primary role of individual prospectors and small exploration firms is likely to remain, as OTA put it, "the development and dissemination of basic geologic and mineral information to serve as a base for the more extensive and sophisticated exploration efforts of larger firms." Congress of the U.S., Office of Technology Assessment, supra, at 73. In other words, the small miner-prospector today is, by and large, an information broker whose function it is to find and preserve what scant surface or near surface mineral showings there are and collect data for periodic referral to the large producers. Though limited, it is a vitally significant role.

> Large companies do use the information that the small miners bring to them, and without it their exploration efforts would be far less comprehensive. The many thousands of small claim owners, each operating on the strong incentive provided by the mining law, bring to the process a specific, localized, proprietary interest in their claims....Both the government and large corporations--with their broad-scale concerns, limited budgets and limited work forces--are

> functionally incapable of the patience, tenacity, thoroughness and persistence that the successful small miner brings to bear on his individual claims; and the data banks of centralized bureaucracies, whether private or governmental, are no substitute for the living memory provided by the periodic appearance of small independent miners from every reach of the public lands promoting their finds.
>
> Thomas S. Barrett, Self-Initiation: The Hardrock Miner's Right (1987) at 27.

Thank you for the opportunity to address these questions. As you proceed with this matter, the participants in the Mining Law Dialogue and the Public Resource Associates remain committed to helping in any way we can.

Sincerely,

Putnam Livermore

Putnam Livermore

Enclosure
/rd

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* Immediate Past Chairman
† Honorary

June 22, 1989

The Honorable Jeff Bingaman
Chairman
Subcommittee on Mineral Resources
  Development and Production
Committee on Energy and Natural
  Resources
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

We are pleased to respond to the additional questions for the record of the June 7, 1989, hearing on the Mining Law and S.1126.

The American Mining Congress responses follow:

Q. The American Mining Congress was willing to support some legislative changes in the Mining Law in the 1970s. The industry bill, the Mineral Development Act of 1977, provided, among other things, for royalty of 2 percent, for annual labor starting at $5 per acre and escalating to $20 per acre, with the option of a payment in lieu of labor, and for a $50 per acre fee for mineral deposits plus fair market value for the remaining interests in the land owned by the United States for mineral patents. While the figures are different, the concepts in some ways are similar to my bill.

- How did the industry arrive at these specific figures? Do you think these figures are still appropriate? Why or why not?

A. The American Mining Congress endorsed the Mineral Development Act as an alternative to a hardrock mineral leasing system. In 1971 and 1977, the Congress was seriously and actively considering a repeal of the Mining Law and enactment of a leasing system. The American Mining Congress membership believed then and continues to believe now, that the Mineral Development Act was an attractive alternative to leasing but is nonetheless inferior to the current system of General Mining Laws.

Q. The industry bill called for either the discovery of a valuable mineral deposit or the filing and approval of a plan of development prior to patent issuance. This approach isn't all that different from my bill. Why did the industry propose an alternative to making a discovery of a valuable mineral deposit?

A. The answer to question 2 is identical to that of question 1. AMC supports retention of the General Mining Laws, which insure and permit self-initiated exploration and security of title in the event of discovery.

Q. How many claims are challenged, or "jumped" by private parties, i.e. a competing locator?

A. The answer to this question is very difficult, if not impossible, to determine. It is not clear whether you are referring to claims located by rival locators because there is no discovery on existing claims or if you are referring to claims that are illegally staked by another locator over valid existing claims. In either case this is virtually impossible to determine.

Q. How would you define a "small miner"?

- To what extent do small miners contribute to mineral development?
- To what extent do they tie up lands and increase the costs of mining?

A. Enclosed is a copy of an article researched and written by me that appeared in the November 1977 issue of the American Mining Congress Journal. The conclusions reached are as valid today as they were in 1977. It discusses in detail just who is the "small miner" and describes the importance of the small miner in exploration and discovery of mineral resources. The conclusion of the study is that the small miner is indeed important in exploration and development and large mineral producers view small miner property submittals quite seriously. We would appreciate it if this article could be included in the hearing record.

Q. How many claims are voluntarily relinquished or abandoned?

A. The American Mining Congress does not have this information. The Bureau of Land Management should be able to supply this from their records.

Q. What is your estimate of the level of annual labor or holding fee that would encourage diligent development?

A. The American Mining Congress believes that the current level of annual labor requirements are more than sufficient to encourage diligent development of mining claims.

Q. What is the average length of time required for the exploration, and development of mineral deposits on federal lands?

A. The average length of time required to bring a mineral prospect into development averages between 7 to 17 years from prospect to production.

Q. Would the industry prefer a system without time limits for development such as in S.1126 and instead increase diligence requirements? Or would it be preferable to clear the books of inactive claims? If time limits are retained should they be longer at the exploration stage or patent state or both? Should they be shorter?

A. The nature of mineral occurrences and world markets for hardrock minerals does not justify imposition of time limits on development. Also, as has been stated previously, current diligence requirements are more than sufficient to promote mineral development. Section 314 of the Federal Land Policy and Management Act requires recordation of mining claims and annual filing of affidavits that annual assessment work requirements have been met. If these required documents are not filed, the law presumes that the claims are abandoned. Therefore, there are no inactive claims carried on the records.

Q. How many claims on average are needed to mine an ore body?

A. There is no average number of claims needed to "mine an ore body." The number of claims required will vary depending on the nature of the ore body.

Q. What are the typical royalty arrangements for hardrock mines on private lands between the landowner and the mining company? What are the typical royalties between the owner of valid mining claim and the operator/mining company on federal lands?

o Are these royalties calculated on gross value or net income? If net, what are the typical deductions?

A. There are no typical royalty arrangements for hardrock mines on private and federal lands. There are two key variables for royalty arrangements--rate and base. There can be many variations of royalty based on geology, whether the money is to be paid uniformly during the life of the mine, whether payments are accelerated at the front end, etc. In general, the narrower the base the higher the rate and vice versa.

Q. In general, what are the terms under which mining claims are transferred or sold?

A. There are no typical terms under which mining claims are transferred or sold. The list of variables is limitless. For instance, terms can be tied to a time frame, a royalty payment, interest in estate, share of fee, etc.

We appreciate the opportunity to respond to these questions and look forward to working with you and your staff on this issue.

Sincerely,

David W. Delcour

David W. Delcour
Chairman
American Mining Congress
Public Lands Committee

Enclosure

by DAVID W. DELCOUR
Director, Governmental Affairs

and DIANE D. REES
Legislative Research Director, Department of Governmental Affairs, Molybdenum Division, Amax Inc

The Role of the Small Miner

The role of the small miner in today's economy has become central to the debate over pending federal proposals to impose tighter control over access to minerals located on public land. Critics of these proposals have stated that they will force the small miner out of business. Supporters, on the other hand, deny that the small miner is any more than a memory of another era.

As we have followed the debate over the Federal Land Policy and Management Act of 1976, the recordation and surface management regulations promulgated or proposed thereunder, and legislation to replace the location-patent system with a leasing system, we have understood both sides to be aware of the problems which may be caused for the small miner. For that reason, we believe it is necessary to determine the precise role of the small miner in the United States in the last quarter of the twentieth century. Is he making the type of contribution which justifies concern for his well-being? Or, is he just an anachronism whose memory stands in the way of modern public land management?

Who is the small miner?

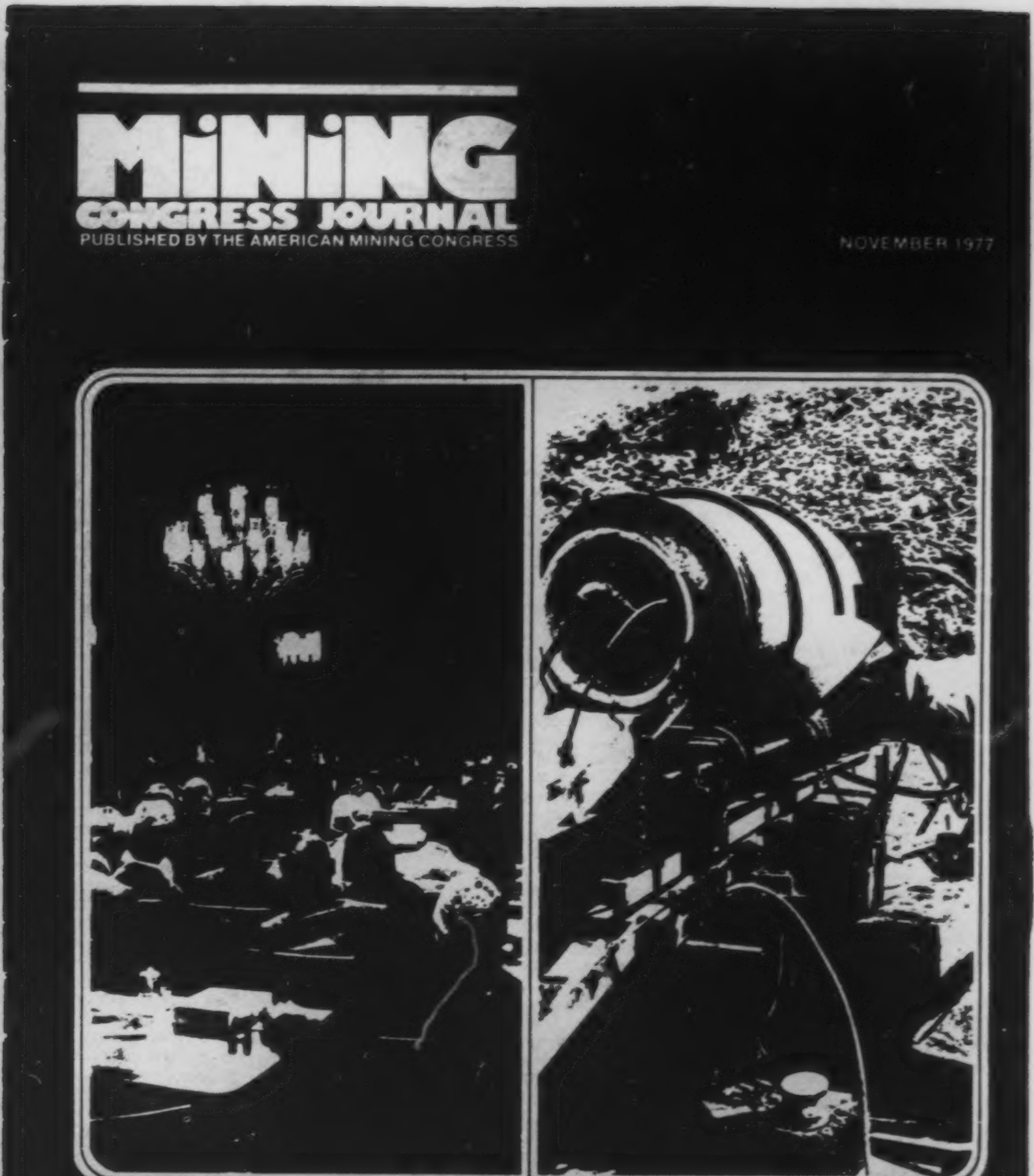
Although the public record is replete with references to the small miner, no comprehensive definition of the term has been generally accepted. In talking to the numerous people initially contacted in connection with this study, we found knowledgeable persons perceiving the small miner as anything from the romanticized old prospector with pick and burro to relatively substantial corporate ventures consummating millions of dollars of business every year. For purposes of this study, a small miner is an individual, partnership or corporation which is not listed on a major stock exchange; or which has capitalization of less than $1 million; or which employs fewer than 50 persons; or which annually produces less than 200,000 tons of coal, industrial minerals or sedimentary materials requiring further processing; or which annually mines or extracts less than 50,000 tons of igneous or metamorphic rock requiring mineral beneficiation.

The definition is admittedly arbitrary, but it is one with

Table 1. Small and large mining operations by state and commodity

State/Product	No. of Operators w/ 0–49 employees	No. of Operators w/ 50+ employees	Total operators in the state 0–49	Total operators in the state 50+
Alabama			5	0
Gold/silver lode	1			
Iron	1			
Bauxite	3			
Alaska			7	0
Barite	1			
Gold/silver lode	6			
Arizona			53	23
Copper	22	22		
Gold/silver lode	19	1		
Lead/zinc	1			
Mercury	1			
Other metal	2			
Feldspar	2			
Fluorspar	1			
Iron	1			
Gypsum	3			
Asbestos	1			
Arkansas			3	1
Barite	1			
Uranium		1		
Gypsum	2			
California			38	5
Gold/silver lode	24			
Tungsten	3	1		
Uranium	1			
Mercury	1			
Other metal	1	1		
Feldspar	1			
Gypsum	3	1		
Chromite	1			
Asbestos	3	1		
Colorado			115	11
Copper	3			
Gold/silver lode	22	1		
Iron	1			
Lead/zinc	4	5		
Molybdenum	1	3		
Tungsten	2			
Uranium	78	2		
Gypsum	4			
Connecticut			2	0
Feldspar	2			
Florida				3
Titanium		3		
Georgia			5	1
Barite	2			
Iron	2			
Feldspar		1		
Bauxite	1			
Idaho			15	5
Gold/silver lode	8	2		
Lead/zinc	5	3		
Other metal	1			
Copper	1			
Illinois			5	1

Indiana			2	
Gypsum	2			
Iowa			6	1
Gypsum	6	1		
Kansas			6	2
Gypsum	3			
Bauxite	3	2		
Kentucky			2	0
Fluorspar	2			
Louisiana			0	1
Gypsum		1		
Maine			1	1
Copper	1	1		
Massachusetts			1	
Titanium	1			
Michigan			5	11
Copper		2		
Iron	1	8		
Gypsum	4	1		
Minnesota			8	20
Iron	7	20		
Other metal	1			
Missouri			11	12
Iron		2		
Lead/zinc	1	10		
Barite	10			
Montana			21	3
Barite	2			
Antimony	1			
Copper	1	3		
Gold/silver lode	12			
Lead/zinc	1			
Gypsum	1			
Iron	1			
Tungsten	1			
Fluorspar	1			
Nevada			33	5
Barite	9			
Copper		3		
Gold/silver lode	14			
Lead/zinc	1			
Tungsten	3	1		
Fluorspar	1			
Iron	1			
Mercury	1			
Gypsum	2	1		
Magnesite	1			
New Jersey			1	3
Iron	1			
Lead/zinc		1		
Other metals		2		
New Mexico			49	31
Copper	6	7		
Lead/zinc	2	1		
Uranium	15	21		
Fluorspar	1			
Iron	2			
Manganese	1			
Other metal	1			
Gypsum	1			
Gold/silver lode	20	1		
Molybdenum		1		
New York			7	6
Iron	1	1		
Lead/zinc	3	3		
Molybdenum		1		
Gypsum	2			
Titanium	1	1		
North Carolina			9	0
Iron	1			
Tungsten	1			
Feldspar	5			
Magnesite	2			
Ohio			1	0
Gypsum	1			
Oklahoma			6	1
Gypsum	6	1		
Oregon			2	1
Gold/silver lode	1			
Lead/zinc	1			
Other metal		1		
Pennsylvania			0	2
Iron		1		
Lead/zinc		1		
South Carolina			2	0
Barite	1			
Manganese	1			
South Dakota			14	1
Gold/silver lode	1	1		
Iron	1			
Uranium	6			
Feldspar	4			
Gypsum	2			
Tennessee			9	11
Copper	1	5		
Lead/zinc	7	6		
Barite	1			
Texas			22	0
Fluorspar	2			
Iron	5			
Uranium	10			
Gypsum	5			
Utah			67	8
Copper	2	2		
Gold/silver lode	4	1		
Lead/zinc	2	2		
Barite	2			
Tungsten	1			
Uranium	49	1		
Iron	1	1		
Titanium	1			
Fluorspar	1			
Gypsum	2	1		
Beryl	2			
Vermont			0	1
Asbestos		1		
Virginia			5	1
Lead/zinc	1	1		
Gypsum	2			
Titanium	1			
Gold/silver	1			
Washington			6	2
Copper	1			
Gold/silver lode		1		
Lead/zinc	1	1		
Other metal	2			
Uranium	1			
Gypsum	1			
Wisconsin			2	1
Lead/zinc	1	1		
Titanium	1			
Wyoming			24	12
Iron	1	2		
Uranium	17	10		
Feldspar	1			
Gypsum	5			



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AMC TESTIFIES ON
MINING LAW REVISION

ROLE OF THE
SMALL MINER

Jaquays Asbestos Corp. is one of the small companies which produce all of the nation's asbestos. Over the past 25 years, the company has produced and sold $11.3 million worth of asbestos and provided $5 million worth of employment. Pictured are the company's Regal and Victory mines in Arizona

estimating the value of the ore body at between $4 and $5 billion.

"In uranium," Sayre points out, "virtually all of the claims have been located by individuals. If you go to the large companies and ask who located their claims, they will point to small miners 95 percent of the time."

Production figures somewhat misleading

The role of the small miner in exploration and discovery is easily documented. But what of his role in production? What is his actual contribution to current American mineral production?

According to the Bureau of Mines, the total value of locatable minerals prouduced by the nation's small miners in 1975 was $256 million, or only 4.5 percent of total U.S. production. A small percentage, at first glance, but again it represents mineral resources which would be lost to production were it not for the nation's small miners. And the figure could mislead one since it does not indicate the importance of the small miner in certain commodities.

Small miners account for the total production of crude asbestos, graphite, kyanite, talc and industrial garnets.[6] They produce more than 60 percent of the nation's perlite and dimension stone and more than half of the barite and feldspar, as well as 49 percent of the mica and 24 percent of the gypsum.[7]

The importance of the small miner differs depending upon the commodity and the location. For example, while small miners produce only 5 percent of the nation's silver, they account for 59 percent of silver production in California, 56 percent in Nevada, and 71 percent in 37 other states. They produce 12 percent of the nation's gold, but 80 percent of California's and 35 percent of New Mexico's.[8]

Some of those operations, particularly with regard to commodities like asbestos, tungsten and gold, would not be worthwhile operations for a large company but provide jobs and income for the small miners and recover valuable resources for the nation.

All U.S. asbestos comes from small operations

D. W. Jaquays, president of Jaquays Asbestos Corp., heads a family-controlled operation that over the past 25 years has produced and sold $11.3 million worth of asbestos and provided $5 million worth of employment, not even considering the employment generated by the firms which supply Jaquay's operation.

"Our operation is one a large company could not operate and would not bother with, since the overhead would be too high and the volume too small to support any interest on their part," Jaquays says.

In addition to being one of the small companies which produce all of the nation's asbestos, Jaquays' operation has won safety awards, contributed to the field of environmental research on asbestos and served as a small miner model of environmental compliance.

According to Kenneth R. Poulson, mining division manager of Brush-Wellman, Inc., and a former president of the Utah Mining Association, for over 30 years the beryllium industry of the nation was supported by foreign sources of beryl ore, with domestic production accounting for only 10 percent of the industry's requirements. During the 1960's, Brush Beryllium Co. (now Brush-Wellman) became interested in properties containing potential low-grade beryllium mineralization—bertrandite—located in western Utah. Bertrandite required a different processing technique than that which existed for processing beryl ore, and after considerable expenditure in time and money, Brush developed that process.

The United States today is totally independent of foreign sources for its beryllium needs. There is a viable and productive beryllium industry supported by a strong domestic source of supply, a source which would not have been available had not a small mining company undertaken to find a way to make a low-grade operation economically feasible.

Small families also making contributions

Even the very small family operation is still making a contribution to today's production. The N. B. Tweet which most people we surveyed feel they can agree. The various parts of the definition were provided by many people: the "major stock exchange" exception and capitalization minimum were arrived at after talking to a number of mineral economists: the Mining Enforcement and Safety Administration (MESA) defines a mine with fewer than 50 employees as a small operation; the American Mining Congress and the National Coal Association provided the 200.000 tons per annum figure for coal: and a number of uranium producers and several of the responding companies suggested the 50.000-ton figure for extraction of igneous or metamorphic rock.

Having arrived at a generally acceptable definition of the small miner, we next sought to measure the small miners' impact on domestic mineral production.

Most mining operations are small

If one looks solely at the number of people employed by mining operations, it quickly becomes clear that there are many more small mining operations than large ones. In 1976, the Bureau of the Census published a Census of Mineral Industries—1972, which showed that 79 percent of all mining operations in the United States employed fewer than 20 persons.

According to Rep. Jim Santini of Nevada, 64 percent of the nonfuel mining operations in this country today are conducted by nine or fewer men.[1]

In Colorado, which keeps its own statistics on mineral production, 80 percent of the mining operations would fit into the small miner category on the definition of employment alone.[2]

MESA statistics for February 1977 showed that of 757 operators mining locatable minerals, 571 (or 75 percent) fit into the small miner category of fewer than 50 persons employed—(see table 1).[3]

While it is interesting to note the numerical dominance of the small miner, that fact alone is insufficient to demonstrate any significant contribution to the nation's mineral inventory.

Small miner important in exploration and discovery

It has often been claimed that most successful exploration in the United States for locatable minerals is accomplished by small miners. In view of the massive amounts of capital required to bring a new ore body into production, small miners must submit their discoveries to larger companies which, in turn, bring the properties into production.

Amax Exploration, Tucson
AMC, Bismark, N.D.
Asarco Inc.
Bethlehem Steel Corp.
CF&I Steel Corp.
Continental Oil Co.
Cyprus Mines Corp.
Cyprus Pima Mining Co.
Day Mines Inc.
Duval Corp.
Enterprise Copper Corp.
Gulf Oil Corp.
Gulf Resources & Chemical Exploration
Hanna Mining Co.
Hecla Mining Co.
Homestake Mining Co.
Ideal Basic Industries
Inspiration Consolidated Copper Co.
Kemmerer Coal Co.
Kennecott Copper Corp.
Newmont Exploration Ltd.
Occidental Minerals Corp.
Oil Shale Corp.
Pfizer Minerals, Pigments and Metals Division
Phelps Doge Corp.
Phillips Petroleum Co.
Placer Amex Inc.
Ravalli County Chapter Montana Mining Association
Rico Argentine Mining Co.
Rock of Ages Corp.
Simplot Mineral Exploration and Development Division
St. Joe Minerals Corp.
Sunoco Energy Development Co.
Sunshine Mining Co.
Superior Oil Co.
U.S. Borax & Chemical Corp.
UV Industries
Utah International Inc.
Volclay American Colloid Co.
Wyo-Ben Products
Wyoming Mineral Corp.

Table 2. Companies that responded to request for information on submittals received from small miners

The importance of the small miner in exploration and discovery has been challenged, with no attempt at documentation, in a 1976 report on Nevada mineral exploration and mine development prepared for and being distributed by the Council on Environmental Quality. The author asserts, in his conclusion, that "Some mining companies have gradually shifted their thinking with respect to the individual prospector. Where formerly he may have been received warmly and his proposal given every consideration, most companies now deliberately make it difficult for a prospector to come in to the office off the street, and his presentations are not taken very seriously."[4]

We believe the opposite to be true: the small miner is indeed important in exploration and discovery. In order to determine the validity of that assertion, 41 large mining companies (table 2) were surveyed in 1976. Those surveyed were asked to provide information on the submittals they had received from smaller miners. We sought specific information on the disposal of submittals.

Table 3 summarizes the results of the questionnaire on property submittals. The information received indicates that over the six-year period from 1970 to 1975, between 2.266 and 2.992 property submittals were made to the 41 major mining companies annually. Of those, an average of 85 percent were submitted by small miners.

Table 3. Disposition of property submittals received by mining companies (table 2) from small miners

				Individual and Small Company Figures Only								
Year	Total no. of Submittals A	Submitted by Individuals and Small Companies B		Rejected C	Examined D		Deal Made E	Drilled F	Dropped G	Still Under Consideration H	Brought into Production or Planned I	Other Disposition J
			% of A			% of B						
1970	2452	2191	89%	1482	917	42%	116	102	222	35	16	72
1971	2266	1918	85%	1353	818	42%	86	83	211	47	13	44
1972	2374	1970	83%	1347	862	44%	93	78	214	41	12	65
1973	2550	2060	81%	1356	954	46%	106	88	244	67	12	41
1974	2777	2381	86%	1629	1028	43%	112	92	315	95	12	54
1975	2992	2621	88%	1808	1139	43%	115	93	301	154	18	[illegible]

It is clear that large mineral producers view small miner submittals quite seriously because an average of 43 percent were investigated further. Moreover, 12 to 18 mines were being planned or brought into production annually from among the properties submitted by small miners. As of mid-1976 when the information was compiled, another 439 properties were still under consideration for future development.

Exploration increasingly difficult

Mineral exploration becomes increasingly difficult every year. Costs go up and techniques become more sophisticated. Nevertheless, small miners continue to be extremely successful in generating the information necessary to enable the commencement of new mineral production. Unfortunately, we have not been able to obtain the number of new mines brought into production per thousand exploration projects undertaken by larger companies. We seriously doubt, however, that the success ratio would be any better than it is for small miner submittals.

It is easy to see the contribution of small miner exploration and development where production is the ultimate result. But, what of the instances where small miner activity leads to a determination that there is insufficient mineralization to proceed further?

Alfred G. Hoyl, president of Coronado Silver Corp. and a former president of the Colorado Mining Association, has pointed out that even in those cases where the individual prospector/small miner does not find evidence of a deposit or ore body of immediate commercial feasibility, he has at least added to our knowledge of the geology of this vast nation.

Table 4. A partial list of potentially productive mineral deposits discovered by the small miner

Deposit Name	State	County	Discovery year	Commodity*
Graysville	Wisconsin	Iowa	1950	Pb, Zn
Jewell	Wisconsin	Iowa	1948	Pb, Zn
Armenias	Virginia	Louisa	1840	Pb, Zn
Seiad Creek	California	Siskiyou	N.A.	Cr
Mill Gulch	California	Tehama	N.A.	Cr
McGuffy Creek	California	Siskiyou	1917	Cr
Helvetia	Arizona	Pima	1880	Cu
Kalamazoo	Arizona	Pinal	1965	Cu
Kirwin	Wyoming	Park	1890	Cu
Rex	Colorado	Boulder	1958	Au, Ag
Pine Flat	California	Del Norte	1950	Ni
Pine Flat Bench	California	Del Norte	1950	Ni
Diamond Flat	California	Del Norte	1950	Ni
Red Flat	Oregon	Curry	1930	Ni
Rough and Ready	Oregon	Josephine	1953	Ni
Woodcock Mt.	Oregon	Josephine	1947	Ni
Brady Glacier	Alaska	—	1958	Ni, Cu
Bokan Mt.	Alaska	—	1958	U
We-Got-Em	Colorado	Gilpin	1880	Au, Cu, Pb, Zn
Three B's	Colorado	Gilpin	1880	Au, Cu
Victoria Lode	Colorado	Gilpin	1880	Pb, Zn, Au, Ag
Buttons	Colorado	Gilpin	1880	Au, Ag, Cu
Golden Cycle	Colorado	Gilpin	1880	Au
Lode Star	Colorado	Gilpin	1880	Au, Ag
Pocahontas	Colorado	Gilpin	1680	Au, Ag

N.A.: Data not readily available

*Metallic symbols:

Ag	Silver	Cu	Copper	U	Uranium
Au	Gold	Ni	Nickel	Zn	Zinc
Cr	Chromium	Pb	Lead		

"Even when the small miner doesn't find anything of economic significance," Hoyl said recently, "he has staked claims and done the assessment work on them and left a record of his knowledge of the mineral potential of an area, inventorying a natural resource which may someday be used.

"For every big company with an exploration division, there are a hundred little guys out there looking around and staking claims. Even the weekend prospectors augment our knowledge of the earth's crust. Thus, we multiply by one hundred the nation's ability to identify its mineral resources. If the individual miner ever loses the right to go out and stake a claim, or if government regulation becomes too burdensome for him to do so, the nation will suffer from a sharp decline in the tremendous amount of mineral information now provided by these people."

Posing with location notice at a newly located claim in New Mexico is Robert H. Sayre Jr. (right), one of the nation's most successful prospectors. With him are assistant Mike Salisbury (left) and son Robert. Sayre says that virtually all uranium claims have been located by individuals

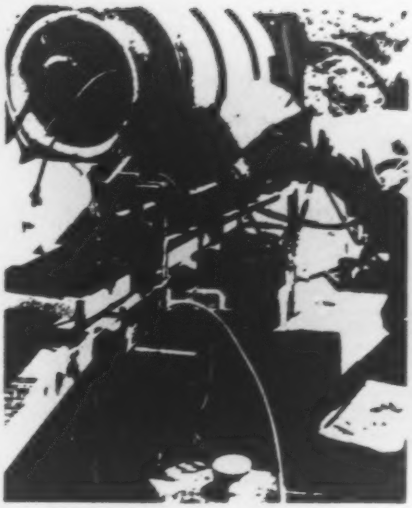
Famous districts found by small miners

Historically, of course, the small miner has done much more than gather data. The U.S. Bureau of Mines recently compiled a report on the number of major mines found by small miners, and the names are most familiar: the Mesabi Range of Minnesota and the iron country of northern Michigan; the Comstock Lode in Nevada; Arizona's copper; Florida's phosphate; Utah's uranium; and Colorado's molybdenum, silver and gold.[5]

The Bureau of Mines also included in its report a list of some potentially productive mineral deposits discovered by the small miner (table 4). The discovery dates on some of these deposits show that the industry does indeed save minerals for the future, for better technology, for greater economic feasibility.

Individuals located bulk of uranium discoveries

It is in the field of uranium exploration and discovery that the small miner has had some of his most notable successes in recent years. Robert H. Sayre, Jr., of Grand Junction, Colo., staked claims on national forest land in New Mexico, managing to interest a small uranium exploration firm, the Bokum Corp., in drilling. Sayre and Bokum found, and later sold to Gulf, what ERDA says is the biggest showing of uranium in United States history.



Richard Singer and his wife Anna have prospected since World War II in Imperial county, California, and organized the Mesquite Mining District. They are working with other small miners to develop the area's mineral resources

family in Alaska mines gold at Taylor, 30 miles from the end of the nearest road. It is their sole source of income and the family gold mining tradition dates back to 1894.[9]

Al Mosch of Idaho Springs, Colo., and his wife Pat, the first woman ever to graduate from Colorado School of Mines with degrees in both geology and mining engineering, keep working on their mine and claims in Clear Creek county. They have recently been joined by their son, David, who received wide press coverage when he found a gold vein and staked the claims on it. For a summer job, the high school senior worked on developing his own mine.

Richard Singer, a disabled veteran, and his wife Anna turned to prospecting after World War II and have discovered several large mineralized zones in southeastern Imperial county, California, and located claims on them. They have organized the Mesquite Mining District and are working with other small miners to develop the area's mineral resources.

Continued access to public lands should be assured

In developing the statistical information and interviews contained in these remarks, we have sought to identify the small miner and the role he plays in today's minerals industry. Our research has convinced us that the small miner continues to be very much a part of the industry. His contribution to the search for new mineral wealth is substantial. Moreover, his share of current production is considerable when viewed on a commodity-by-commodity basis.

The consequences for the future of the American economy, should the small miners' role be diminished by a shifting approach to public lands management, could be severe. Policy planners, in both the executive and legislative branches of the government, must assure the small miners' continued access to public lands to search for, develop and produce new mineral wealth without the fear that he will be unable to enjoy the fruits of his labors.

References

[1] "Small Miner Decries Mineral Myopia." *Congressional Record*, June 7, 1977, p. E 3587.

[2] *A Summary of Mineral Industry Activities in Colorado for 1975*, Colorado Division of Mines, Department of Natural Resources, State of Colorado.

[3] "Number of Mine Operations by Size, Industry, and Type," February 16, 1977, Mining Enforcement and Safety Administration, U.S. Department of the Interior.

[4] *Nevada Mineral Exploration and Mine Development 1950-1972*, Anthony Payne, University of Nevada, Reno, prepared for Council on Environmental Quality, Washington, D.C., January 1976.

[5] "Major Mines Found by Small Miners," unpublished report of the U.S. Bureau of Mines, Department of the Interior.

[6] "Locatable Minerals Produced in the U.S. in 1975 by State and Proportion Produced by Small Miners," unpublished report of the U.S. Bureau of Mines, Department of the Interior, June 24, 1977.

[7] *Ibid.*

[8] *Ibid.*

[9] *The Alaska Miner*, May 1977.

David Delcour is director-governmental affairs for the Molybdenum Division of Amax Inc. Prior to his appointment to this post in May, Delcour was an attorney for the company's Western Area Law Department for two years. Delcour also spent five years on the staff of former Colorado Congressman Donald G. Brotzman as both legislative assistant and administrative assistant. Earlier, he was a law clerk to the late Judge O. L. Phillips of the U.S. Court of Appeals for the 10th Circuit.

Diane Rees has been legislative research director for the Amax Molybdenum Division of Amax Inc. for the past year. During her career, Rees has been minority partisan staff aide in the Colorado House of Representatives, a writer and publicist with the Bureau of Conferences and Institutes, and a reporter for the Colorado Springs Gazette Telegraph and the Pueblo, Colo., Star-Journal

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August 3, 1989

The Honorable Jeff Bingaman, Chairman
Subcommittee on Mineral Resources
Development and Production
Committee on Energy and Natural Resources
United States Senate
362 Dirksen Building
Washington, D.C. 20510-6150

Re: S. 1126, The Mining Law of 1989

Dear Senator Bingaman:

Under cover of your letter of June 14, 1989, you posed three additional questions for the record relating to S. 1126. This letter responds to those questions.

On June 19, 1989 I sought and received additional time to respond to your letter. My colleagues, Randall Hubbard, Lisa Bain and Richard Westfall, and our law clerk, Chris Hayes, and I appreciate the additional time.

1. **Please describe the current test for determining discovery of a valuable mineral deposit.**

Public lands valuable for minerals are reserved from sale and disposal, except under the mining laws. 30 U.S.C. § 21 (1976). Section 1 of the General Mining Law provides that all "valuable mineral deposits" in public lands shall be open to exploration, and that the lands in which these deposits occur shall be open to occupation and purchase. 30 U.S.C. § 22 (1976). While the General Mining Law requires a "discovery," 30 U.S.C. § 23 (1976), it does not define the term. That task has been left to the Department of the Interior and the courts.1/

1/ For reliable and scholarly analyses of discovery see Reeves, The Origin and Development of the Rules of Discovery, 8 Land &
(continued...)

There is only one test for discovery: the "prudent person" test. The prudent person test was adopted by the Supreme Court in 1905 in Chrisman v. Miller, 197 U.S. 313 (1905). Under this test, the locator of an unpatented mining claim must show that he has discovered a valuable mineral deposit within the boundaries of the claim by presenting evidence that the deposit is of such a character that a person "of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success, in developing a valuable mine".[2]

The prudent person test for discovery is applied differently, however, depending upon whether a dispute is between the United States and a private mining claimant, or between private, rival mining claimants.[3]

a. The Test for Controversies Involving the United States.

In cases in which the United States is a party, the issue is not whether one or another mineral claimant will be entitled to the use of the public land, but whether the land shall be removed from the public domain.[4] In such

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1/(...continued)
Water L. Rev. 1 (1973); Reeves, The Law of Discovery Since Coleman, 21 Rocky Mtn. Min. L. Inst. 415 (1976); 2 Am. L. Mining § 35.01-35.14[4] (2d ed. 1984).

[2] Chrisman v. Miller, 197 U.S. 313 (1905); Castle v. Womble, 19 L.D. 455, 457 (1894).

[3] Berto v. Wilson, 74 Nev. 128, 324 P.2d 843, 845 (1958); 2 Am. L. Mining § 35.10[1] (2d ed. 1984). Until 1961, the Department had applied two different rules of discovery, applying a stringent rule to patent adjudication. After United States v. Carlile, 67 I.D. 417 (1960), the Department began to apply only one rule of discovery. It was Carlile that set the Department on the path to more and more strict application of discovery rules, finally leading to United States v. Coleman, 390 U.S. 599 (1968). See Reeves, The Origin and Development of the Rules of Discovery, 8 Land & Water L. Rev. 1, 62 (1973).

[4] The United States is a party when an owner of a mining claim applies for a patent, when the United States initiates a contest against a locator, when there is a controversy between a mining claimant and a lessee of oil and gas from the United
(continued...)

circumstances, the prudent person test is and should be applied strictly.

The United States has paramount title to public lands until a patent is issued. The federal government has an interest in protecting its title until the requirements for proving a valid patented claim are satisfied. The prudent person test provides an objective measure by which the federal government can disallow fraudulent or unfounded mining claims.[5]

Under the strict application of the prudent person test a claimant must meet the marketability "refinement" of the test.[6] Under the marketability rule, the claimant must show that he has a reasonable prospect of success in developing a "valuable" mine, value being measured in terms of the claimant's ability to extract and sell the claimed mineral in an existing market at a profit.[7] Various kinds of evidence will support a

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4/(...continued)
States, in controversies between a mining claimant and a holder of an easement or special use permit from the United States, and in controversies between a mining claimant and a homestead patentee, a Small Tract Act claimant, or a Taylor Grazing Act lessee. The government may initiate a contest against a claimant at any time. Budget constraints limit enforcement, and government contests historically have been associated with reservations, withdrawals or similar federal public land management decisions inconsistent with the use of public lands for mining.

5/ United States v. Coleman, 390 U.S. 599 (1968). Whether Coleman announced a new rule of discovery or a mere "refinement" is debatable. In any event, the marketability rule made discovery substantially more difficult to establish.

6/ When the dispute is between two private mining claimants, the marketability refinement to the prudent person test is not applied. 2 Am. L. Mining § 35.12[1] (2d ed. 1984); Converse v. Udall, 399 F.2d 616 (9th Cir. 1968).

7/ United States v. Coleman, 390 U.S. 599 (1968); Husman v. United States, 616 F. Supp. 344, 347 (D. Nev. 1985); Rodgers v. Watt, 726 F.2d 1376, 1379 (9th Cir. 1984); Barrows v. Hickel, 447 F.2d 80, 83 (9th Cir. 1971). The marketability refinement to the prudent person test was developed by the Interior Department and adopted by the Supreme Court in United States v. Coleman as a method of quantifying the value element of the prudent person test. The marketability refinement focuses upon (continued...)

finding of prudence under the marketability rule: expert testimony by trained geologists, metallurgists or mining engineers;[8] economic projections of the costs of extraction, processing and transportation;[9] estimates of expected recovery;[10] market information documenting existence, location and size of potential markets;[11] and assay reports concerning the presence and concentration of valuable minerals,[12] have all been considered in claim adjudications.

The marketability rule does not require that a claimant show actual successful exploitation of a claim, but it does require objective evidence that the material can be sold in a presently existing market at a profit.[13] The claimant may not rely upon anticipated improvement of the relevant market,[14] and may not rely upon the possibility that future development of

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7/(...continued)
present profitability and demands a review of the economic factors that a locator would consider in deciding whether or not to develop a mine.

8/ Chrisman v. Miller, 197 U.S. 313 (1905); Converse v. Udall, 399 F.2d 616 (9th Cir. 1968), cert. denied, 393 U.S. 635 (1969); Thomas v. Morton, 408 F. Supp. 1361 (D. Ariz. 1976).

9/ Lara v. Secretary of the Interior, 820 F.2d 1535 (9th Cir. 1987); Multiple Use, Inc. v. Morton, 353 F. Supp. 184 (D. Ariz. 1972), aff'd, 504 F.2d 448 (9th Cir. 1974); Fresh v. Udall, 228 F. Supp. 738 (D. Colo. 1964).

10/ Hallenbeck v. Kleppe, 590 F.2d 852 (10th Cir. 1979).

11/ Rodgers v. Watt, 726 F.2d 1376 (9th Cir. 1984); Verrue v. United States, 457 F.2d 1202 (9th Cir. 1972); Foster v. Seaton, 271 F.2d 836 (D.C. Cir. 1959).

12/ Hallenbeck v. Kleppe, 590 F.2d 852 (10th Cir. 1979); Thomas v. Morton, 408 F. Supp. 1361 (D. Ariz. 1976).

13/ Fresh v. Udall, 228 F.Supp 738 (D. Colo. 1964); In re Pacific Coast Molybdenum, 75 IBLA 16, 29, 90 I.D. 352, 360 (1983) (a mining claimant must show that as a present fact, considering historic price and cost factors and assuming that they will continue, there is a reasonable likelihood of success that a paying mine can be developed). See also Barrows v. Hickel, 447 F.2d 80, 83 (9th Cir. 1971).

14/ Barrows v. Hickel, 447 F.2d 80 (9th Cir. 1971).

the claim will result in discovery of larger quantities or better concentrations of the mineral in question.[15]

b. The Test for Controversies Involving Private Claimants.

In disputes between private mining claimants, a more liberal standard of evidence is applied to satisfy the prudent person test.[16] This liberal standard is entirely appropriate. In disputes between rival claimants, each is claiming the same ground, usually on the strength of the same mineralization. In such cases, the paramount title of the United States is not in controversy. Rather, priority between locators is the issue, and the United States is or ought to be indifferent to the result.

In disputes between rival claimants, the private claimant must show 1) that locatable minerals have been found within the boundaries of the claim, and 2) that the quantity and quality of these minerals is of such character that a person of ordinary prudence would be justified in the further expenditure of labor and means with a reasonable prospect of success in developing a valuable mine.[17]

The requirement that there be valuable minerals within the boundaries of the claim is satisfied by a showing that some valuable mineral is present in the vein at the surface or exposed in a drill hole, shaft or trench. Geological inference of the existence of a valuable mineral is not enough. There must be actually and physically exposed within the limits of the claim a vein or lode of mineral-bearing rock in place possessing a locatable mineral.[18]

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[15] United States v. White, 72 I.D. 522 (1965).

[16] Rummell v. Bailey, 7 Utah 2d 137, 320 P.2d 653, 656 (1958) ("[T]he statute requires some discovery of mineralization in place on the claim . . . [but] it need only be such as would lead a miner to pursue such indications with a reasonable expectation of finding ore. . . "); Anaconda v. Whittaker, 188 Mont. 66, 610 P.2d 1177, 1179 (1980) ("The liberality . . . which exists between rival claimants is in the consideration and application of the evidence admitted at trial and does not involve a liberal construction of the statutory requirements."); Nevada-Pacific v. Gustin, 226 F.2d 286, 287-88 (9th Cir. 1955), cert. denied, 351 U.S. 930 (1956) ("The mineral content of the area is tungsten. Both sets of claimants predicate their rights on the reputed discovery of tungsten ore in place. There is competent evidence . . . that both are claiming the same vein or lode . . . . In such circumstances, no more than a slight showing by a prior locator of discovery of a mineral bearing vein or lode is needed to satisfy the legal requirements requisite to a valid location.")

[17] Boscarino v. Gibson, 207 Mont. 112, 672 P.2d 1119, 1122 (1983).

The requirement that the locator be justified in a reasonable expectation of success need not be met by showing the existence of "pay ore." Nor must the claimant prove that he will in fact make a profit. The evidence need only support the conclusion that a person of ordinary prudence would risk his labor and means with a reasonable expectation of developing a valuable mine.[19] The prudent person test has enough flexibility to allow a claimant to hold his claim against a junior locator, even in an apparently marginal operation, if there is a reasonable prospect of success.[20]

c. Is the test for discovery applied consistently and are the results of the cases consistent?

Throughout its long history, the General Mining Law has been the focus of much litigation. Nevertheless, relatively few of the cases brought to trial deal with the question of whether there has been a discovery.

When the government contests a claim, the contest is most often resolved finally at the IBLA level on the specific facts presented. Since the IBLA's decision in United States v. Carlile, 67 I.D. 417 (1960) and since the Supreme Court decision in Coleman, the IBLA and the courts have applied the prudent person test with its marketability refinement to all government contests. The law of discovery is well settled enough that there have only been 37 appeals from IBLA discovery decisions since the Supreme Court recognized the marketability refinement in 1968.[21] The rule of discovery is clear in cases in which

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[18] Rummell v. Bailey, 7 Utah 2d 136, 320 P.2d, 656 (1958); Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708, 714, 717 (D. Utah 1965); Murray v. White, 42 Mont. 423, 433-434, 113 P. 754, 756 (1911). The courts do not specify how much of a valuable mineral must be found in order to constitute a discovery: mere indications are not sufficient, however, paying quantities are not required. Dallas v. Fitzsimmons, 137 Colo. 196, 323 P.2d 274, 278-279 (1958); Anaconda v. Whittaker, 188 Mont. 66, 610 P.2d 1177 (1980).

[19] Boscarino v. Gibson, 207 Mont. 112, 672 P.2d 1119, 1123 (1983); Converse v. Udall, 399 F.2d 616 (9th Cir. 1968), cert. denied, 393 U.S. 635 (1969); Book v. Justice Mining Co., 58 F. 106, 124 (C.C.D. Nev. 1893); Andrus v. Shell Oil Co., 446 U.S. 657, 663 (1980) (present marketability held not prerequisite to patenting of oil shale claims); Montana Cent. Ry. v. Migeon, 68 F. 811 (C.C.D. Mont. 1895), aff'd., 77 F. 249 (9th Cir. 1896); Adams v. U.S., 318 F.2d 861, 870 (9th Cir. 1963).

[20] 2 Am. L. Mining § 35.11[6][d] (2d ed. 1984).

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[21] Andrus v. Shell Oil Co., 446 U.S. 657 (1980); Andrus v. Charlestone Stone Products, Inc., 436 U.S. 604 (1978); Lara v. Secretary of the Interior of the United States, 820 F.2d 1535 (9th Cir. 1987); Rodgers v. Watt, 726 F.2d 1376 (9th Cir. 1984); Dredge Corp. v. Conn, 733 F.2d 704 (9th Cir. 1984); United States v. Brown, 672 F.2d 808 (10th Cir. 1982); McCall v. Andrus, 628 F.2d 1185 (9th Cir. 1980), cert. denied, 450 U.S. 996 (1981); Baker v. United States, 613 F.2d 224 (9th Cir. 1980), cert. denied sub nom., Andrus v. Baker, 449 U.S. 932 (1980); Hallenbeck v. Kleppe, 590 F.2d 852 (10th Cir. 1979); Laden v. Andrus, 595 F.2d 485 (9th Cir. 1979); Edwards v. Kleppe, 588 F.2d 671 (9th Cir. 1978); Ideal Basic v. Morton, 542 F.2d 1364 (9th Cir. 1978); Rawls v. United States, 566 F.2d 1373 (9th Cir. 1978); Humboldt Placer Mining v. Secretary of Dept. of Interior of the United States, 549 F.2d 622 (9th Cir. 1977), cert. denied, 434 U.S. 836 (1977); Roberts v. Morton, 549 F.2d 158 (10th Cir. 1976), cert. denied, 434 U.S. 834 (1977); Melluzzo v. Morton, 534 F.2d 860 (9th Cir. 1976); Boyle v. Morton, 519 F.2d 551 (9th Cir. 1975), cert. denied, 423 U.S. 1033 (1975); United States v. Zweifel, 508 F.2d 1150 (10th Cir. 1975); Multiple Use, Inc. v. Morton, 504 F.2d 448 (9th Cir. 1974); Brubaker v. Morton, 500 F.2d 200 (9th Cir. 1974); United States v. Springer, 491 F.2d 239 (9th Cir. 1974), cert. denied, 419 U.S. 834 (1974); United States v. Haskins, 505 F.2d 246 (9th Cir. 1974); Barrows v. Hickel, 447 F.2d 80 (9th Cir. 1971); Henault Mining Co. v. Tysk, 419 F.2d 766 (9th Cir. 1969), cert. denied, 398 U.S. 950 (1970); Udall v. Garula, 405 F.2d 1181 (10th Cir. 1968); Udall v. Snyder, 405 F.2d 1179 (10th Cir. 1968), cert. denied sub nom., Snyder v. Hickel, 396 U.S. 819 (1969); White v. Udall, 404 F.2d 334 (9th Cir. 1968); Converse v. Udall, 399 F.2d 616 (9th Cir. 1968), cert. denied, 393 U.S. 1025 (1969); Husman v. United States, 616 F. Supp. 344 (D. Wyo. 1985); Tosco v. Hodel, 611 F. Supp. 1130 (D. Colo. 1985); Mendenhall v. United States, 556 F. Supp. 444 (D. Nev. 1982), aff'd, 735 F.2d 1371, cert. denied, 469 U.S. 1209 (1985); United States v. Smith Christian Mining Enterprises, 537 F. Supp 57 (D. Or. 1981); Russell v. Peterson, 498 F. Supp. 8 (D. Or. 1980); Thomas v. Morton, 408 F. Supp. 1361 (D. Ariz. 1976), aff'd, 552 F.2d 871 (9th Civ. 1977); Doria Mining and

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the United States is a party, and the Department and the courts give lip service to the test with great consistency.

However, one cannot say that the results are consistent in cases in which the government is a party. The marketability refinement is very broad and it introduces difficult issues of fact which are resolved in the first instance by the Department. On appeal, the Department enjoys great deference by the courts, and this limited scope of review deters appeals. A close evaluation of discovery decisions by the Department might well disclose inconsistent results which escape judicial review.

On the other hand, in the context of private disputes, the courts apply the test consistently with highly predictable results. There are countless controversies over conflicting mining claims, but very few of these disputes ever reach the courts. Only 25 discovery cases between private claimants have been reported in the past 40 years.22/ This

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21/(...continued)
Engineering Corp. v. Morton, 420 F. Supp. 837 (D. Cal. 1976), vacated, 608 F.2d 1255 (9th Cir. 1979), cert. denied sub nom., California v. Doria Mining & Engineering Co., 445 U.S. 962 (1980); Duval v. Morton, 347 F. Supp. 501 (D. Or. 1972); Skaw v. United States 2 Cl. Ct. 795 (1983), vacated, 740 F.2d 932 (1984).

22/ Rasmussen Drilling v. Kerr-McGee Corp., 571 F.2d 1144 (Wyo. 1978), cert. denied, 439 U.S. 862 (1978); Lombardo Turquoise Mining & Milling Co. v. Hemanes, 430 F. Supp. 429 (D. Nev. 1977); Gustin v. Nevada-Pacific Development, 125 F. Supp. 811 (D. Nev. 1955), aff'd, 226 F.2d 286, cert. denied, 351 U.S. 930 (1956); Gilmore v. Rubeck, 708 P.2d 486 (Colo. App. 1985); Silver Jet Mines Inc. v. Schwark, 210 Mont. 81, 682 P.2d 708 (1984); Boscarino v. Gibson, 207 Mont. 112, 672 P.2d 1119 (1983); Alyeska Pipeline v. Anderson, 629 P.2d 512 (Alaska 1981), cert. denied, 454 U.S. 1099 (1981); Anaconda v. Whittaker, 188 Mont. 66, 610 P.2d 1177 (1980); Geomet Exploration v. Lucky Mc Uranium, 124 Ariz. 55, 601 P.2d 1339 (1979), cert. granted, 447 U.S. 920 (1980), cert. dismissed, 448 U.S. 917 (1980); Bunker Chance Mining Co. v. Bex, 90 Idaho 47, 408 P.2d 170 (1965); Dredge Corp. v. Husite, 78 Nev. 69, 369 P.2d 676 (1962), cert. denied, 371 U.S. 821 (1962); Coos Bay Timber Co. v. Bigelow, 228 Or. 467, 365 P.2d 619 (1961); United Western Minerals Co. v. Hannsen, 363 P.2d 677 (Colo. 1961); White v. Ames Mining Co., 82 Idaho 71, 349 P.2d 550 (1960); Western Standard Uranium Co. v. Thurston, 355 P.2d 377 (Wyo. 1960); Cram v. Church, 9 Utah 2d 169, 340 P.2d 1116 (1959);
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paucity of litigation suggests that the General Mining Law is working and that the law of discovery is not difficult to apply. In fact, from personal experience I can say that the law of discovery is so well defined that private claimants are able to settle disputes between themselves in all but a very few cases.[23]

The results of cases in which the prudent person test is applied to private disputes are consistent. Each mining claim presents a unique set of facts to which the prudent person test must be applied. The outcome of the cases will therefore vary according to the specific facts presented.[24] For example, the evidence of discovery for a sand and gravel deposit will be different from that adduced for a bentonite or gold claim.[25]

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[22] (...continued)
Dallas v. Fitzsimmons, 137 Colo. 196, 323 P.2d 274 (1958); *Parsons v. Kazange*, 158 C.A.2d. 779, 323 P.2d 577 (1958); *Rummell v. Bailey*, 7 Utah 2d 137, 320 P.2d 653 (1958); *Berto v. Wilson*, 74 Nev. 128, 324 P.2d 843 (1958); *Globe Mining Co. v. Anderson*, 78 Wyo. 17, 318 P.2d 373 (1957); *Mandel v. Great Lakes Oil & Chemical Co.*, 150 Cal. App. 2d 621, 310 P.2d 498 (1957); *Kramer v. Taylor*, 266 P.2d 709 (1954); *Ponton v. House*, 75 Ariz. 303, 256 P.2d 246 (1953); *Betts v. Stephenson*, 100 C.A.2d 361, 223 P.2d 651 (1951).

[23] *See* Appendix A attached hereto for a summary of the leading cases.

[24] *Rummell v. Bailey*, 7 Utah 2d 137, 320 P.2d 653, 658 (1958); *Ranchers Exploration and Development Co. v. Anaconda Co.*, 248 F.Supp 708, 720 (D. Utah 1965); *Lombardo Turquoise Milling & Mining Co. v. Hemanes*, 430 F. Supp. 429 (D. Nev. 1977); *Converse v. Udall*, 399 F.2d 616 (9th Cir. 1968), *cert. denied*, 393 U.S. 635 (1969).

[25] Congress withdrew common varieties of sand and gravel and other materials from location on July 23, 1955 under the Surface Resources Act of 1955. A claimant asserting the validity of a claim for a common variety must be able to establish that the claim was valid before the material was removed from location. Therefore, the claimant must establish that the claim would have satisfied the prudent person test on July 23, 1955. Only if the claim would have satisfied the prudent person test as of July 23, 1955 may the claimant assert the claim's continued validity at the time of the hearing. Therefore, the claimant must prove a discovery both as of July 23, 1955, and at the date of hearing or contest. *Dredge v. Conn*, 733 F.2d 704, 707 (9th
(continued...)

Oil, oil shale and common varieties involve application of special statutes which require somewhat different evidence.[26]

In considering discovery of inherently valuable minerals such as gold, silver and some other metallic minerals, courts will presume a ready market for the metal, focusing instead on the characteristics of the deposit.[27]

25/(...continued)
Cir. 1984); Andrus v. Shell Oil, 446 U.S. 657 (1980).

The Surface Resources Act of 1955 withdrew from location all deposits of "common varieties" of sand, gravel, building stone and other materials, but created an exemption for "uncommon varieties" of those materials. Uncommon varieties may be located according to the rules governing deposits of minerals like copper, lead, and other base metals. The claimant bears the burden of showing the distinct and special value of the deposit. Alyeska Pipeline Service Co. v. Anderson, 629 P.2d 512 (Alaska 1981), cert. denied, 454 U.S. 1099 (1981).

[26] Placer mining claims for oil and oil shale are singled out in both case law and administrative decisions. Oil shale claims enjoy the benefit of a standard that does not require a showing that the claimants could presently profit from the development of their claims. This standard was first approved in Freeman v. Summers, 52 L.D. 201 (1927). In Freeman, oil shale claims were allowed on the basis of the assertion that "there is no doubt of its [oil shale's] value and of the fact that it constitutes an enormously valuable resource for future use by the American people." Freeman at 206. This holding was ratified by Congress several times after the Freeman decision in a 1930-31 review of shale claims, in the 1956 enactment of an amendment to the mining laws regarding patenting of shale claims, and by the protection of shale claims from the provisions of the 1920 Mineral Lands Leasing Act, which grandfathered then-existing valid claims. See also Shell v. Kleppe, 426 F. Supp. 894, (D. Colo. 1977), aff'd sub nom., Andrus v. Shell Oil, 446 U.S. 657 (1980) (upholding the Freeman rule and the claims seeking its protection). See also Tosco v. Hodel, 611 F. Supp. 1130 (D. Colo. 1985).

[27] The Coleman court found that "[p]recious metals which are in small supply and for which there is great demand, sell at a price so high as to leave little room for doubt that they can be extracted and sold at a profit." Coleman at 603.

2. **How does the uncertainty inherent in the current test for discovery affect the miner's security of tenure on an unpatented mining claim.**

It is often said that the owner of a valid mining claim has a property right in the highest sense of the term. So long as he complies with statutory obligations of maintenance, he is entitled to hold that claim against all the world, subject only to the paramount title of the United States. But unless the locator monuments, posts, stakes, validates and properly records his claim, and unless his claim is supported by a discovery of a valuable mineral deposit, the locator has no mining claim at all. Prior to discovery, the locator has only the protection of pedis possessio so long as he is in actual, physical occupancy, diligently searching for minerals.[28]

While the law of discovery is relatively well-settled, establishing a discovery depends upon an application of the law to facts bearing upon the nature and character of the mineral deposit. There is, of course, uncertainty inherent in any application of law to facts.[29] The degree to which the miner must occupy and work the claim is much greater before discovery than after. Accordingly, any uncertainty about discovery motivates the miner to occupy the ground and prove up a discovery.

The General Mining Law carefully balances the miner's interest in security of title against the public interest in diligent development of mineral resources. The balance struck in the mining law affords the miner security of tenure roughly commensurate with his level of investment. The prospector has little commitment to a prospect and his investment is relatively small. Accordingly, the prospector, prior to discovery, has only the security of tenure afforded by pedis possessio.

Upon discovery, a miner has a substantial commitment to the prospect, and needs the commensurate security of a valid unpatented mining claim. A valid claim is secure against other private parties without actual possession.[30/] Before a miner commits to huge expenditures for construction of a mine and processing facilities, the mining law permits him to secure a mineral patent, a title every bit as secure as Blackacre.

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[28] For a thorough discussion of pedis possessio, see Appendix B.

[29] In my view, the sort of uncertainty is modest in comparison with the greater insecurities of the many new administrative determinations contemplated in S. 1126.

The law of discovery and the way the law is applied by the courts affects the miner's security of tenure because it is discovery upon which a mining claim is premised. In the absence of discovery, a prospector has no mining claim at all, and, if a prospector has no discovery and also neglects to maintain actual possession, the prospector neither has nor should have any right whatsoever to hold public lands against other qualified locators willing to work the ground.

While there are those in the industry who complain that the mining law gives inadequate security to the prospector, they are the minority.[31/] The courts have resisted the claims of those who would expand the pedis possessio doctrine to allow them to hold public lands without either a discovery or possession. In my view, the courts are right. Public policy is better served by pressing the prospector to achieve a discovery while affording the discoverer and the miner the security of a valid claim and, ultimately, a patent.

3. What is the significance of the Amax v. Mosher decision?

The unreported opinion in AMAX v. Mosher, Civil R-85-162 (D. Nev. 1987) is of little significance to the General Mining Law of 1872. The case does disprove the point frequently made by environmentalists and some members of

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30/ A valid mining claim is real property, good against the world, subject only to the paramount title of the United States. While its owner must represent the claim by performance of annual assessment work, the owner need not actually occupy the claim, as some witnesses mistakenly testified before the Committee.

31/ Compare Olson, New Frontiers in Pedis Possessio: MacGuire v. Sturgis, 7 Land & Water L. Rev. 367 (1972), with Sherwood and Greer, Possessory Interests in Wyoming Mining Claims, 4 Land & Water L. Rev., 337 (1969); see also Foreman, Dwyer, and Cox, Judicial Uncertainties in Applying the Mining Doctrine of "Pedis Possessio," 3 Natural Resources Law 467 (1970); Fiske, Pedis Possessio--Modern Use of an Old Concept, 15 Rocky Mtn. Min. L. Inst. 181 (1969); Twitty and Reeves, 2 Legal Study of Non-Fuel Mineral Resources, 348 et seq. (1969); 1 American Law of Mining §§ 4.7 to 4.12 (1976).

Congress that mining claims are giveaways, requiring little more than six posts, a sheet of paper, and a filing fee. AMAX v. Mosher makes very clear once again that in order to hold public lands under the mining laws, a claimant must have either a discovery or actual possession.

Perhaps the most significant aspect of the case is that it reached the courts at all.[32] AMAX v. Mosher was a garden variety dispute between private mining claimants. The decision in the case was simply a correct application of the laws of discovery and pedis possessio to a situation involving a large block of conflicting unpatented mining claims held by rival claimants. There is little to distinguish the AMAX case from hundreds of similar situations involving the location and validity of overlapping mining claims.

The facts of the case are as follows: AMAX Exploration, Inc. ("AMAX") filed suit in 1985 against Ross Mosher and a number of other individuals seeking a judicial declaration quieting title to and declaring the validity of a number of unpatented mining claims located in Humboldt County, Nevada. AMAX's asserted claims conflicted with a number of unpatented claims asserted by the defendants. The controversy first arose when, in June and July of 1982, a company called Desert Mountain Surveying located a group of unpatented placer claims known as the NA claims, and a group of unpatented lode claims known as the Sleeper claims, on behalf of John Wood, an AMAX geologist. As is typical in the mining industry, Desert Mountain made these locations only after Mr. Wood had conducted a thorough surface inspection of the ground to be covered by the claims. Shortly after the location of those claims, however, Ross Mosher and another defendant, Jim Henager, visited Desert Mountain's offices and complained that the NA and Sleeper claims conflicted with certain claims asserted by the defendants.

As a result of the complaints, Desert Mountain conducted a second surface inspection and checked the Humboldt County records for location certificates for any conflicting claims. There were location certificates for conflicting groups of unpatented placer claims referred to as the GR and A&R claims of record in Humboldt County, and they named the defendants as locators. Employees of Desert Mountain, however, found no location monuments for those claims on the ground (as required by Nevada law). The defendants took no further action, and when AMAX filed amended location certificates for its NA and Sleeper claims in August of 1984, its employees found only one location monument on the ground for one of the conflicting A&R claims. Although the defendants annually filed assessment affidavits for all the conflicting A&R and GR claims, AMAX claimed that its employees never observed the defendants or any of their agents performing any work on the ground.

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[32] Very few private mining disputes ever reach the courts. From 1949 to 1989 we have found only 25 reported cases dealing with discovery issues. That such disputes are resolved short of litigation in the quiet of mining lawyers' offices of Denver, Reno, Elko, Tucson and Sacramento is perhaps the most persuasive testimony to the predictability and wisdom of the General Mining Law of 1872 and the body of jurisprudence which fills its interstices.

In early 1985, however, after AMAX announced the opening of a mine in an area near the ground covered by the conflicting claims, Mr. Mosher and Roland and Ray Fraijo (also defendants) appeared and attempted to take surface samples from the conflict area. AMAX then filed suit to keep the defendants from conducting any further exploration operations within the conflict area, and to obtain a judicial declaration of the validity of its entire block of claims.

AMAX had strong evidence of discoveries and/or possession with respect to many of its claims. Accordingly, prior to trial, the parties entered into a settlement under which AMAX obtained control of the majority of the conflicting claims. The parties then proceeded to trial on other outlying claims, remote from AMAX's operations where AMAX's exploration activity had been relatively modest. The reported decision in AMAX v. Mosher dealt only with these remaining claims.

In reaching its decision as to the validity of the conflicting claims in question, the Nevada District Court considered the propriety of (a) the location procedures employed by the parties, (b) whether a discovery of a valuable mineral had been made on any of the claims by either party (discovery being a prerequisite to the validity of each of the claims), and (c) whether either party had acquired any pedis possessio rights through actual occupation of any of the claims and diligent attempts to make a discovery.

Location Procedures

The court concluded that AMAX, in compliance with Nevada law and federal law, had properly staked and posted notices of location on its claims, recorded certificates of location and maps of the claims with the Humboldt County Recorder and filed copies of those location certificates with the Nevada State Office of the Bureau of Land Management. Except for one of the conflicting A&R unpatented placer claims, the court found no evidence of any monumentation of any of those conflicting claims on the ground. As a result, all the A&R claims but one were held to be invalid, despite the fact that they had purportedly been located prior to the AMAX claims. The court determined that AMAX was the senior locator of all the conflict area covered by the A&R claims except for a 20 acre area covered by the A&R Claim No. 1. The court found that the location of the GR claims was procedurally proper, and prior to the location of the conflicting AMAX claims. As to all of the senior claims, however, whether located by AMAX or by the defendants, the court noted that the "fact of [proper] location alone is of no value to the parties." (Id. at 9).

Discovery

The court began its discussion of discovery by reciting the rule that a discovery is essential to the validity of a mining claim, even if the locator followed proper location procedures. The court set forth the familiar test for discovery:

> there must be for a lode claim discovery within rock in place of mineral having actual or potential value or of such character that a person of ordinary prudence would be justified in the further expenditure of his labor and means on the particular claim, with a reasonable prospect of success in developing a valuable mine (Id. at 10).

The court also took note that the test for discovery ought to be liberally applied when determining priority of rights between private claimants.

The court then applied the discovery test set forth above, and determined that neither AMAX nor the defendants had proven a discovery of a valuable mineral on any of the claims in question. The claims taken to trial were remote from AMAX's operations, and AMAX's work had been limited to mapping and surface sampling. It had done very little drilling. On the other hand, in light of proven deposits nearby, the parties argued by geologic inference that there was excellent potential for discovery on the claims at issue. The court, relying on well-settled authority, found that such extrapolation indicating promising potential for exploration did not constitute a discovery. The defendants had taken samples from some of their claims in the area, but could not match particular samples with particular claims, and had not even attempted to find mineralization in all of their claims. Moreover, the defendants failed to present credible evidence that their assays of the samples taken were accurate. The court held that defendants' evidence was inadequate to show a discovery on any of their claims.

The court found that seniority of location was no substitute for proof of discovery. The court did not apply a stringent or unusual test for discovery. It simply applied existing, well-settled law to require discovery of a valuable mineral deposit. The court determined that no such showing had been made, and found all of the claims to be invalid.

Pedis Possessio

The court then turned to the issue of pedis possessio. Having held that neither AMAX nor the defendants had valid mining claims, the court then found neither of the parties satisfied the requirements for pedis possessio. Under the doctrine of pedis possessio, miners are protected from intrusion by third parties while in actual, physical occupancy of public lands, diligently searching for minerals. Pedis possessio is often called a "prediscovery right," since it is under that doctrine, if at all, that a prospector may hold public lands until he makes a discovery of a valuable mineral deposit. Once a miner makes a valid discovery, he can locate an unpatented mining claim or, if he has already staked the ground, the discovery "perfects" the claim. Until a miner makes a discovery, he must maintain physical presence on the located claim and be actively seeking discovery of a locatable mineral to be protected under pedis possessio.

Members of the Mining Dialogue who testified at the June 7, 1989, hearing held by the Subcommittee on Mineral Resources Development of the Senate Energy and Natural Resources Committee discussed pedis possessio and cited AMAX v. Mosher as an example of pedis possessio's flaws. Mr. Putnam Livermore, for example, characterized AMAX v. Mosher as "a devastating case," one which demonstrated that a miner's right to an unpatented mining claim during the exploration/pre-discovery phase were "completely uncertain." Transcript at 196. With due respect to the Mining Dialogue, I could not disagree more.

The gist of Mr. Livermore's point is that AMAX v. Mosher shows the flaws of the doctrine of pedis possessio because AMAX, a mining operator diligently pursuing a discovery of a valuable mineral, was left unprotected against third parties by existing law. The facts do not support that contention.

One must not forget that prior to trial, AMAX had secured by settlement most of the ground in dispute. Left for trial was ground relatively remote from AMAX's operations. While AMAX had planned to do exploration work on those outlying claims, it had done little work at the time the dispute arose. AMAX had no discoveries there, and it had not demonstrated actual physical occupancy. On those facts, it is difficult to see how a court could reach any other result. The defendants in the case had even less evidence of discovery and possession. In rejecting both parties' claims and possession, the court nicely articulated the policy which underpins the doctrine of pedis possessio:

> "The development of the doctrine of pedis possessio came about out of a desire to encourage the prospector whose concentrated and diligent work epitomizes the objectives of Congress in enacting the general mining law. The doctrine favors the prospector in actual possession, protecting him against forcible, clandestine or fraudulent intrusions by others, so that he may continue to prospect the area of possession diligently. There is a great difference between this and recognizing some right short of discovery to support contiguous, unoccupied claims solely upon geologic inferences and an area-wide program of exclusion." Id. at 17 (emphasis added).

AMAX v. Mosher is not a "devastating case." In fact, the case has little or no significance to the Mining Law of 1872. It was justifiably unreported because it represents no more than a fact-bound application of existing law.33/ If the

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33/ AMAX v. Mosher was not the first case in which the District Court for the District of Nevada had made a finding rejecting so-called "buffer claims." In Lombardo Turquoise Milling and Mining v. Hemanes, the court considered the validity of a number of conflicting claims and ruled that neither party had made a discovery on a number of claims surrounding their valid existing claims. The court added that

> the defensible rights of a locator before a discovery depend on actual possession and working the prospect. Constructive possession flowing from a paper title is insufficient. In fact, the common practice

(continued...)

case stands for anything at all, it is an example of what has been a positive aspect of the General Mining Law for over 100 years: public policy rewards diligent development of mineral resources and discourages the holding of large blocks of public land under purported mining claims without discovery or possession.

Conclusion

This analysis of the law of discovery and pedis possessio, undertaken at the Senator's behest, finds no justification for the repeal of the Mining Law of 1872. S. 1126 contemplates sweeping and unjustified changes to the mineral land tenure system in the United States.

The rules of law governing discovery and pedis possessio are not at all uncertain. On the contrary, they are very clear. My analysis shows that the application of the rules, at least in disputes between private parties, is consistent and, in my view, well serves sound public policies.

One might well argue that the Department does not apply the marketability rule fairly or consistently. If Congress perceives the problem to be the Department, the appropriate response is oversight hearings and rulemaking, not repeal of the Mining Law of 1872.

Similarly, a case can be made for expanding the possessory protection afforded by the doctrine of pedis possessio. If Congress shares that view, the appropriate response is not S. 1126, but rulemaking under the authority of 30 U.S.C. § 22 (1976) providing some exclusive possession along with, say, an operating plan approved by the Department.

I want to thank the Committee once again for this opportunity to respond. The Committee may be assured of my

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33/ (...continued)

> of locating buffer claims contiguous to a valid claim where the only discovery has been made should be judicially disapproved and no such claims should receive judicial support in the form of equitable relief. Lombardo Turquoise Milling and Mining v. Hemanes, 430 F. Supp. 429, 443-44 (D. Nev. 1977).

continued cooperation in its consideration of the proposed legislation.

Respectfully,

Stephen D. Alfers
for
DAVIS, GRAHAM & STUBBS

APPENDIX A

LEADING DISCOVERY CASES

1. **Private Disputes**

In the few reported cases not resolved between private mining claimants themselves, the courts consistently apply the prudent person test. Rummell v. Bailey, 7 Utah 2d 137, 320 P.2d 653 (1958), involved two private rival claimants in a quiet title action to certain uranium claims. The court explained that in a dispute between private mining claimants, there is a marked liberality in the application of the prudent person test in favor of the prior locator in order "to foster and encourage the discovery and development of mineral resources by providing a practical method of procedure for those who in good faith desire to search out and develop such reserves in the public domain." Id. at 656. The discovery, it found, "need not be of any particular assay or richness in quality, nor any specified amount in quantity, nor need it be sufficient that it would immediately pay mining expenses. The only essential is that the discovery must be of such significance that a practical, experienced miner of prudence and judgment would deem it advisable . . . to expend further time, effort or money in attempting to develop the property as a mine." Id. at 657.

In Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965), a private mining claimant disputed the existence of a mineral discovery on certain beryllium claims located by a rival claimant. The court explained that the prudent person test is to be applied liberally as between private claimants, but that there is no substitute for discovery within the boundaries of the claim. Id. at 714-715. The prudent person test requires a discovery, "within a rock in place, of a mineral having actual or potential value or of such character that a person of ordinary prudence would be justified in the further expenditure of his labor and means . . . with a reasonable prospect of success in developing a valuable mine." Id. at 714. The court held that no discovery had been proved on several of the challenger's claims because the claimant had shown only geological indications from which the existence of beryllium could be inferred, not the existence of the beryllium itself. Id. at 717. However, the court held that other of the claims did contain valid mineral discoveries. On those claims, drill-hole samples, which showed significant quantities of beryllium-bearing tuff, were sufficient to prove a discovery. Id. at 719.

In Anaconda v. Whittaker, 188 Mont. 66, 610 P.2d 1177 (1980), the Montana Supreme Court held that under the prudent person test, a discovery could not be sustained only on the basis of geologic studies. Holding that Anaconda had to show actual discovery of a vein, lode or rock in place bearing a valuable mineral deposit, the court stated that "the liberality . . . which exists in a contest between rival claimants is in the consideration and application of the evidence admitted at trial and does not involve a liberal construction of statutory requirements." Id. at 1179. The court thus affirmed the principle that each claim must be supported by actual discovery, rather than geological inference or regional geological trends.

Similarly, in Boscarino v. Gibson, 207 Mont. 112, 672 P.2d 1119 (1983), the court held that as between private rival claimants, the test for discovery is the prudent person test. In upholding the appellants' gold placer claims, the court emphasized that the federal statutes do not require that the ground must yield a specific quantity of precious metals to support a discovery; nor must the deposits be sufficiently extensive to pay the operating expenses of the mining operation. To constitute a discovery, said the court, one must only show that the quantity and quality of the material justifies the locator in spending time and money on the claim with a reasonable expectation of finding mineral in paying quantities. Id. at 1123.

2. Cases in Which the Government is a Party

In addition to disputes between private claimants, beginning with the U.S. Supreme Court's 1968 decision in United States v. Coleman, 390 U.S. 599 (1968), the prudent person test, with its marketability refinement, has also been consistently applied to disputes in which the United States is a party. As the Court explained in Coleman, federal policy encourages discovery of economically valuable mineral deposits. A valuable mineral deposit is one for which there is a present demand and for which the costs of extraction do not exceed expected revenues. Coleman at 602-603. If there is no demand for a mineral, it is not objectively prudent to mine it. Even if there is demand, a prudent person will not develop a mine unless the mineral can be sold at a price that exceeds the cost of extraction. Coleman at 602-603. Courts since Coleman have consistently applied the prudent person test with the marketability refinement in the form outlined above by the Supreme Court; first analyzing demand for the mineral, then calculating the potential for profit.

Converse v. Udall, 399 F.2d 616 (9th Cir. 1968), cert. denied, 393 U.S. 635 (1969), came hard on the heels of Coleman. In Converse, the Ninth Circuit applied the prudent person test with its marketability refinement, as newly formulated in Coleman, to a contest involving claims for copper, lead and zinc. Reasoning that there is a ready market for base metals, the court explained that it must then consider "evidence as to cost of extraction and transportation as bearing on whether a person of ordinary prudence would be justified in the further expenditure of his labor and means. But this does not mean that the locator must prove that he will in fact develop a profitable mine." Converse at 622. The court invalidated the claim upon a showing that the mineralization discovered was "slight and insufficient to meet the prudent man test in light of the remoteness and inaccessibility of the claim." Id. at 623. The court affirmed that the "nucleus of value which sustains a discovery must be such that with actual mining operations under proper management a profitable venture may reasonably be expected to result." Id. at 623.

In Barrows v. Hickel, 447 F.2d 80 (9th Cir. 1971), the Ninth Circuit applied the prudent person test with its marketability refinement to disallow the appellant's sand and gravel claims, which had been contested by the United States. The court found that there was no present demand for the claimant's material because what limited demand there was had been satisfied by higher quality sand and gravel from other claims. Having determined that there was no demand for the material, the court concluded that a prudent person would not be justified in the expectation of developing a profitable mine from that claim.

In Hallenbeck v. Kleppe, 590 F.2d 852 (10th Cir. 1979), another mining contest between a private claimant and the United States, the Tenth Circuit invalidated the claimant's gold and sand and gravel claims using the prudent person test with its marketability refinement. As to the sand and gravel claim, the court found that there was no local market for sand and gravel, and did not reach the issue of costs and profits. As to the gold claim, the court, as the Supreme Court had in Coleman, assumed a ready market for gold and other precious metals. However, the court invalidated the gold claim as being insufficiently profitable to attract to efforts of a prudent person. The claim would have yielded from one to three cents per cubic yard of material and the court found that no prudent person could expect to extract, remove and market such small quantities of gold at a profit.

In the recent Court of Appeals decision on mineral discovery, Lara v. Secretary of Interior, 820 F.2d 1535 (9th Cir. 1987), the Ninth Circuit again applied the prudent person test with the marketability refinement to invalidate a gold claim. As the Tenth Circuit did in Hallenbeck, the Ninth Circuit assumed a ready market for gold and concentrated on a comparison of costs and profits. In disallowing the claim, the court reaffirmed the language in Converse that said a present showing of profitability is not required for precious metals claims, but evidence of costs and profits is relevant to determine whether a prudent person would be justified in a further investment of labor and capital. Lara at 1541. See also U.S. v. New York Mines, Inc., 105 IBLA 171, 182, GFS(MIN)1 (1989) (Interior Board of Land Appeals, in light of the Lara decision, ruled that a showing that a precious metal can presently be extracted, removed and marketed at a profit is not required, but evidence of the costs and profits of mining the claim should be considered in determining whether a person of ordinary prudence would be justified in the future investment of labor and capital).

APPENDIX B

PEDIS POSSESSIO

The General Mining Law invites all qualified persons to occupy and to prospect on unappropriated public land. While prospecting, the miner enjoys the legal status of a mere licensee. Since prospecting necessarily precedes discovery, the courts have fashioned a doctrine to protect the prospector's occupancy in advance of location and discovery. That doctrine is known as pedis possessio.

The doctrine of pedis possessio was created by the courts early in the century and the courts apply the doctrine with remarkable consistency. Pedis possessio, was most clearly enunciated by the Supreme Court in Union Oil of California v. Smith:

> It is held that upon the public domain a miner may hold the place in which he may be working against all others having no better right, and while he remains in possession, diligently working towards discovery, is entitled, at least for a reasonable time, to be protected against forcible, fraudulent, and clandestine intrusions upon his possession.
>
> . . . .

Whatever the nature and extent of a possessory right before discovery, all authorities agree that such possession may be maintained only by continued actual occupancy by a qualified locator or his representatives engaged in persistent and diligent prosecution of work looking to the discovery of mineral. (Emphasis added.)[1]

Pedis possessio requires that the occupant establish and maintain actual, physical possession of the ground connected with a diligent search for mineral.2/ Possession must be actual and physical, and the occupant may not resort to constructive possession.3/

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[1] Union Oil Company of California v. Smith, 249 U.S. 337, 346-348, 39 S. Ct. 308 (1919). See also Cole v. Ralph, 252 U.S. 286, 40 S. Ct. 321 (1920); Crossman v. Pendery, 8 F. 693, 2 McCrary 139, 4 Morr. Min. Rep. 431 (C.C.D. Colo. 1881); Miller v. Chrisman, 140 Cal. 440, 73 P. 1080 (1903); 1 Lindley on Mines § 218 (3d ed. 1914).

The occupant's possession must be continuous.4/ If he relaxes his occupancy and an intruder enters, the prior occupant has lost his possessory right.

The occupant's possession must be exclusive.5/ The occupant must exclude intruders from the claim and any acquiescence in an intrusion is fatal. The manner and degree with which the occupant must resist the intruder is open to question. In Adams v. Benedict, the court favored the junior occupant who resisted the forcible reentry of the senior occupant by protesting loudly and riding some forty yards on the blade of a Caterpillar tractor. While such extremes are not required by the rule, the cases are replete in which telephone calls and threats of trespass actions were insufficient.

Possession must be associated with work reasonably directed toward discovery of a valuable mineral.6/

2/ Cole v. Ralph, 252 U.S. 286, 40 S. Ct. 321 (1920); Union Oil Co. of California v. Smith, 249 U.S. 337, 39 S. Ct. 308 (1919); Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965). Adams v. Benedict, 64 N.M. 234, 327 P.2d 308 (1958); 1 Am. L. Min. § 4.8 n.1 (1976).

3/ Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965); but see Kanab Uranium Corp. v. Consolidated Uranium Mines, Inc., 227 F.2d 434 (10th Cir. 1955).

4/ Cole v. Ralph, 252 U.S. 286, 40 S. Ct. 308 (1920).

5/ Adams v. Benedict, 64 N.M. 234, 327 P.2d 308, 317.

6/ Cole v. Ralph, 252 U.S. 286, 40 S. Ct. 321 (1920); Union Oil Co. of California v. Smith, 249 U.S. 337, 39 S. Ct. 308 (1919); Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965); United States v. Midway Northern Oil Co., 232 F. 618 (S.D. Cal. 1916); L. W. Lowell, 40 L.D. 333 (1911); Isaac P. Clark, 48 L.D. 630 (1922); United States v. Ruddock, 52 L.D. 313 (1927); Ohio Oil Co. v. Kissinger, 60 I.D. 342 (1949); McLemore v. Express Oil Company, 158 Cal. 559, 112 P. 59 (1910); New England & Coalinga Oil Co. v. Congdon, 152 Cal. 211, 92 P. 180 (1907); Ferris v. McNally, 45 Mont. 20, 121 P. 889 (1912); Sparks v. Mount, 29 Wyo. 1, 207 P. 1099 (1922); Whiting v. Straup, 17 Wyo. 1, 95 P. 849 (1908); Phillips v. Brill, 17 Wyo. 26, 95 P. 856 (1908); cf. McKenzie v. Moore, 20 Ariz. 1, 176 P. 568 (1918); Adams v.

(continued...)

Acts of location such as posting, marking, monumenting, staking, and recording, without more, have been held not to satisfy the requirements of pedis possessio.[7] Mere performance of assessment work is not enough.[8] Policing the claims, placing signs, or fences, is insufficient.[9] Negotiations with others for the performance of such work does not suffice,[10] but construction of drilling pads may be enough under certain circumstances.[11] It is generally held that work

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6/(...continued)
Benedict, 64 N.M. 234, 327 P.2d 308 (1958). It is usually held that such work must be performed on the claim for which the protection of pedis possessio is sought. Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965); Adams v. Benedict, 64 N.M. 234, 327 P.2d 308 (1958); Fiske, 15 Rocky Mtn. Min. L. Inst. 181, 195 (1969); Sherwood and Greer, 4 Land & Water Rev., 337, 346 (1969); 1 Amer. L. Min. § 4.10 (1976); but see MacGuire v. Sturgis, 347 F. Supp. 580 (D. Wyo. 1971); Olson, "New Frontiers in the Pedis Possessio: MacGuire v. Sturgis," 7 Land & Water Rev. 367 (1972).

7/ Adams v. Benedict, 64 N.M. 234, 327 P.2d 308 (1958). See also Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965); New England and Coalinga Oil Co. v. Congdon, 152 Cal. 211, 92 P. 180 (1907); Whiting v. Straup, 17 Wyo. 1, 95 P. 849 (1908); Borgwardt v. McKittrick Oil Co., 164 Cal. 650, 130 P. 417 (1913); Bulette v. Dodge, 2 Alas. 427 (1905).

8/ United States v. Stockton Midway Oil Co., 240 F. 1006 (S.D. Cal. 1917); Mountain States Development Co. v. Taylor, 50 L.D. 348 (1924); United States v. Hurliman, 51 L.D. 258 (1925); Cochran v. Bonebrake, 57 I.D. 105 (1940); McInery v. Allebrand, 107 Cal. App. 457, 290 P. 530 (1930). 1 Amer. L. Min. § 4.8 n.2 (1976).

9/ Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965); New England and Coalinga Oil Co. v. Congdon, 164 Cal. 211, 92 P. 180 (1947); Whiting v. Straup, 164 Cal. 650, 130 P. 417 (1913).

10/ McLemore v. Express Oil Co., 164 Cal. 650, 130 P. 417 (1913); Pacific Midway Oil Co., 44 L.D. 420 (1915); In re Parker, 54 I.D. 165 (1933).

11/ United States v. Grass Creek Oil & Gas Co., 236 F. 481 (8th Cir. 1916). 1 Amer. L. Min. § 4.8 n.7 (1976), cf. Adams v. Benedict, 64 N.M. 234, 327 P.2d 308 (1958).

in developing exploration plans, without more, is insufficient.12/

Once an occupant establishes that he has been in actual, continuous, and exclusive possession of public land, diligently engaged in work directed toward a discovery of a valuable mineral, pedis possessio gives the occupant the exclusive right to prospect on his claim and the right to deny entry to others. It is generally held that an occupant entitled to pedis possessio may protect not only the ground in the immediate vicinity of his workings, but his entire claim if the claim has been clearly staked and monumented.13/

This traditional rule of pedis possessio sets up a stiff standard for the modern explorationist. To comply with the letter of the law, the explorationist must establish and maintain a presence on every claim, and his possession must be continuous. His presence must be associated with genuine exploration. And he must be ever alert to identify intruders and take prompt and decisive action to eject them.

For two decades now, a minority in the mining industry has argued that pedis possessio is inadequate for modern exploration. Testimony from Mr. Livermore in these hearings made that point. In MacGuire v. Sturgis, 347 F. Supp. 580 (D. Wyo. 1971), the court extended pedis possessio rights to a group of claims, even though the occupant was in actual, exclusive, and continuous possession, engaged in work toward a discovery of valuable mineral on some of the claims.

MacGuire v. Sturgis, when decided, was inconsistent with Union Oil Co. of California v. Smith, Ranchers Exploration and Development Co. v. Anaconda Co., and Adams v. Benedict, and

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12/ Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965); Adams v. Benedict, 64 N.M. 234, 327 P.2d 308 (1958) (dictum); Granlick v. Johnson, 29 Wyo. 349, 213 P. 98 (1923). But see, MacGuire v. Sturgis, 347 F. Supp. 580 (D. Wyo. 1971).

13/ See Gemmel v. Swain, 28 Mont. 331, 72 P. 662 (1903). Cf. Hess v. Winder, 30 Cal. 349 (1866); 1 Amer. L. Min. § 4.10 n.8 (1976). However, pedis possessio rights cannot extend beyond the boundary of the claim. Geomet Exploration, Ltd. v. Lucky Mc Uranium Corporation, 601 P.2d 1339 (Ariz. 1979). Adams v. Benedict, 64 N.M. 234, 327 P.2d 308 (1958); See also Ranchers Exploration and Development Co. v. Anaconda Co., 248 F. Supp. 708 (D. Utah 1965); Sherwood and Greer, 4 Land & Water Rev. 337, 346 (1969). But see Olson, New Frontiers in Pedis Possessio: MacGuire v. Sturgis, 7 Land & Water L. Rev. 367, 369 (1972).

even case law in Wyoming. Although the U.S. Court of Appeals for the Tenth Circuit seemed later to approve of the rule of MacGuire v. Sturgis in Continental Oil Company v. Natrona Service, Inc., 588 F.2d 792 (10th Cir. 1978), the Arizona Supreme Court thoroughly argued the issue in Geomet Exploration, Ltd. v. Lucky Mc Uranium Corporation,[14] and rejected the "expanded" doctrine of pedis possessio. MacGuire v. Sturgis should not be regarded as "the law" anywhere, with the possible exception of Wyoming. Although the rule of MacGuire v. Sturgis is even now sometimes urged upon the courts, is has been repeatedly rejected as an unwarranted invitation to speculation in public lands.

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[14] 601 P.2d 1339 (Ariz. 1979).

APPENDIX II

Additional Material Submitted for the Record

National Audubon Society

NATIONAL CAPITAL OFFICE 801 PENNSYLVANIA AVENUE, S.E. WASHINGTON, D.C. 20003 (202) 547-9009

89 JUN 16 P 2:15

June 15, 1989

The Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral
Resources Development and Production
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

At the hearing held by your Subcommittee on June 7, 1989 on the Mining Law of 1872 and S. 1126, you indicated that the record of the hearing would be kept open for two weeks for statements from additional witnesses.

Please include the enclosed statement in that record.

Thank you.

Sincerely,

Elvis J. Stahr

Elvis J. Stahr
President Emeritus

Enclosure
EJS/rd
cc: Senator Bumpers
Senator McClure

National Audubon Society

NATIONAL CAPITAL OFFICE 801 PENNSYLVANIA AVENUE, S.E. WASHINGTON, D.C. 20003 (202) 547-9009

Statement of Elvis J. Stahr
President Emeritus of the National Audubon Society

I am Elvis Stahr, President Emeritus of the National Audubon Society and an associate of Public Resource Associates. In submitting this statement, I am not representing the National Audubon Society, although I have followed closely the informal and ongoing Dialogue between representatives of the mining community and representatives of the environmental community on the subject of updating the Mining Law of 1872, a Dialogue in which, initially at my behest, the National Audubon Society is directly involved.

Since 1982 I have been one of a small but representative group engaged in studying the Mining Law, researching its problems and possible improvements and searching for common ground on desirable changes. The initial results of that study were summarized in my testimony on behalf of the Public Resource Foundation at the June 23, 1987, oversight hearing on the Mining Law held by the House of Representatives Subcommittee on Mining and Natural Resources (pp. 92-110).

I attended the hearing on the Mining Law and on S.1126 held by the Senate Subcommittee on Mineral Resources Development and Production on June 7, 1989. Many of the complexities and potential conflicts inherent in the subject were brought out at the hearing. Like your Committee, I am desirous of an outcome

Recycled Paper

that will be as fair as possible to all concerned and beneficial to the public interest, but history shows that opinions tend quickly to become polarized when the Mining Law of 1872 is even mentioned.

Therefore, I urge your Subcommittee and the full Committee, with a special plea to Senator Bumpers, author of S. 1126, to consider very particularly and most carefully the written testimony of Putnam Livermore, president of Public Resource Associates, submitted at the June 7 hearing. In it you will find keys to the development of a much improved law for hardrock mining on the public lands, one that will be solidly in the national interest and, on balance, more favorable than is the present law to the mining industry and to the environment as well.

Finally, let me underscore that the Dialogue process described at the hearing by witnesses Livermore, Babcock and Greenwalt is indeed ongoing, and I urge the Committee to give it a full and fair chance and in due course to consider its recommendations most carefully.

MEC MINERALS EXPLORATION COALITION

Minerals Advocate
In Public Policy

Reply to
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☐ L.C. Lee

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Washington Representative
L. Courtland Lee
3814 West Street
Landover, Maryland 20785
(301) 322-5762

June 23, 1989

Senator Jeff Bingaman
United States Senator
524 Hart Senate Office Building
Washington, D.C. 20510

Dear Senator Bingaman:

Attached please find a study of the impact of the proposed S. 1126 Mining Law of 1989 on a real project (unnamed) that is being placed into production by Echo Bay Mines in the United States.

This study evaluates the impact of this law on taxes and investment rates of return as if this project existed in various different tax jurisdictions in the United States and Canada.

There are several important points that this study reveals:

- Under current law, the principal gold producing states are Competitive with and, in fact, enjoy a slight tax advantage over Canadian provinces.

- Under the proposed S. 1126 Mining Law of 1989 the situation is considerably different. The most favorable U. S. tax jurisdiction in Alaska would be considerably worse than the most expensive Canadian province (British Columbia).

- Present after-tax internal rates of return for invested capital for this project in the U.S. are competitive with Canadian provinces, but this is sharply reversed under the proposed S. 1126 Mining Law of 1989.

- Finally, the projected after-tax internal rate of return for this project in the U.S. drops below a 105 threshold by implementation of the proposed S. 1126 Mining Law of 1989. This project therefore would not be placed into production under the proposed law.

In summary:

- The proposed S. 1126 Mining Law of 1989 substantially reduced the competitive tax position of the United States for mining projects versus Canada.
- The proposed law will reverse the decision to develop currently attractive mineral deposits because of substantially reduced after-tax rates of return.
- The United States Treasury will lose substantial revenue due to the loss of federal income tax and lost payroll taxes as projects are deferred in the U. S.
- Job opportunities in the rural West will be lost.

Please accept these comments for the hearing record on the S. 1126 Mining Law of 1989.

Sincerely yours,

Bradford A. Mills
Chairman
Minerals Exploration Coalition

BAM/rc
attachment
cc: Bennethum

IMPACT OF PROPOSED MINING LAW OF 1989
ON U.S. MINERAL PRODUCERS

COMPARISON OF TAX JURISDICTIONS

CANADA PROVINCIAL	UNITED STATES STATE

JUNE 20, 1989

DESCRIPTION OF APPLICABLE TAXES

1. Federal Income Tax- Canadian Rate - Regular 28.84%
   U.S. Rates - Regular 34% ; AMT 20%

   Federal Taxable Income = Revenue less allowable deductions (deductions include depletion or resource allowance; exploration and development)

2. Federal Sales Tax - Canada - Rate 12% - Production equipment is exempt

3. State/Provincial Income Tax - Rates range from 0 to 14.5%. Taxable income is generally a modified form of federal taxable income

4. Provincial Capital Tax - Ontario .3%
   Quebec .48%

   The tax is calculated on the total capital investment of the corporation

5. State Business & Occupational Tax - Washington Rate -.484% of gross receipts

6. State/Provincial Sales Tax - Rates range from 0-9% of the sales price of tangible personal property

7. State/Provincial Property Tax - Rates range from 0-6% of the assessed value of real and personal property

8. Provincial Mining Tax - Rates range from 15-20% of a modified federal taxable income

9. Northwest Territories Royalty (Mining Tax) - Graduated rates from 3-12% of a modified federal taxable income

10. State Net Proceeds Tax - Colorado - Nevada
    Rates range from 2-6% of net proceeds. The tax may be based on a percentage of gross or on revenues less allowable deductions

11. State Severance Tax - Rates range from 2.25-2.5% of the gross value of production

12. Proposed Mining Tax Law of 1989 - The proposed bill would institute an 8% royalty on the value of minerals extracted from federal lands. It would also increase the annual holding costs on claims and mandate additional reclamation requirements.

BASIC ASSUMPTIONS USED IN TAX COMPARISON MODEL

1. 11 year project ; 9 years of production
2. 695,000 total ounces of gold produced
3. Gold price - $400 per ounce
4. Project financed with debt - 12%
5. Average cash cost per ounce - $187
6. Total building and equipment expenditures - $53,049,000
7. Total exploration and development expenditures $16,351,000

19-Apr-89

COMPARISON OF TAX JURISDICTIONS
PROJECT TAXES PAYABLE
TAXES PER OUNCE OF GOLD PRODUCED
U.S. $ 000
CURRENT LAW

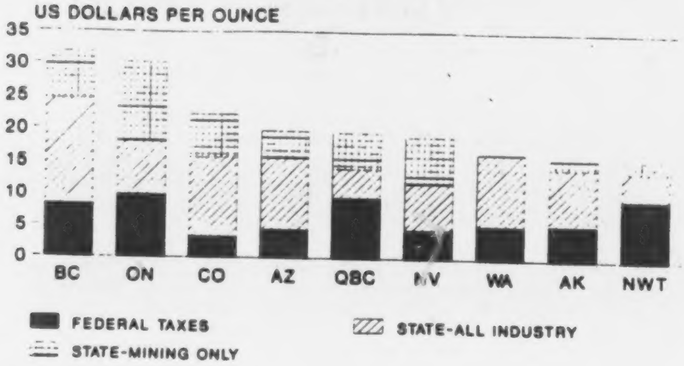
	AVERAGE	BRITISH COLUMBIA	ONTARIO	COLORADO	ARIZONA	QUEBEC	NEVADA	WASH.	ALASKA	NWT
FEDERAL TAXES										
FEDERAL INCOME TAX	4,437	5,265	6,320	2,306	3,082	6,112	3,150	3,690	3,800	6,204
FEDERAL SALES TAX	208	469	469	N/A	N/A	469	N/A	N/A	N/A	469
TOTAL FEDERAL TAXES	4,645	5,734	6,789	2,306	3,082	6,581	3,150	3,690	3,800	6,673
FEDERAL TAXES PER OUNCE	6.68	8.25	9.77	3.32	4.43	9.47	4.53	5.31	5.47	9.60
PROVINCIAL/STATE TAXES										
TAXES ON INDUSTRIES:										
INCOME TAX	1,744	5,116	5,134	357	701	1,075	N/A	N/A	1,059	2,051
CAPITAL TAX	116	N/A	378	N/A	N/A	665	N/A	N/A	N/A	N/A
BUSINESS TAX	149	N/A	N/A	N/A	N/A	N/A	N/A	1,345	N/A	N/A
STATE SALES TAX	1,830	1,310	237	3,183	2,228	355	3,052	3,981	2,122	N/A
PROPERTY TAX	2,645	4,830	N/A	5,008	4,818	1,024	2,014	2,395	2,976	941
TOTAL	6,484	11,256	5,749	8,548	7,747	3,119	5,066	7,721	6,157	2,992
TOTAL PER OUNCE	9.33	16.20	8.27	12.30	11.15	4.49	7.29	11.11	8.86	4.31
MINING INDUSTRY TAXES:										
MINING TAX/ROYALTY	2,050	5,036	8,401	N/A	N/A	3,816	N/A	N/A	N/A	1,199
NET PROCEEDS	925	N/A	N/A	3,400	N/A	N/A	4,928	N/A	N/A	N/A
SEVERANCE	544	N/A	N/A	1,132	2,821	N/A	N/A	N/A	941	N/A
TOTAL	3,519	5,036	8,401	4,532	2,821	3,816	4,928	0	941	1,199
TOTAL PER OUNCE	5.06	7.25	12.09	6.52	4.06	5.49	7.09	0.00	1.35	1.73
TOTAL TAXES	14,648	22,026	20,939	15,386	13,650	13,516	13,144	11,411	10,898	10,864
TOTAL TAXES PER OUNCE	21.08	31.69	30.13	22.14	19.64	19.45	18.91	16.42	15.68	15.63

21-Jun-89

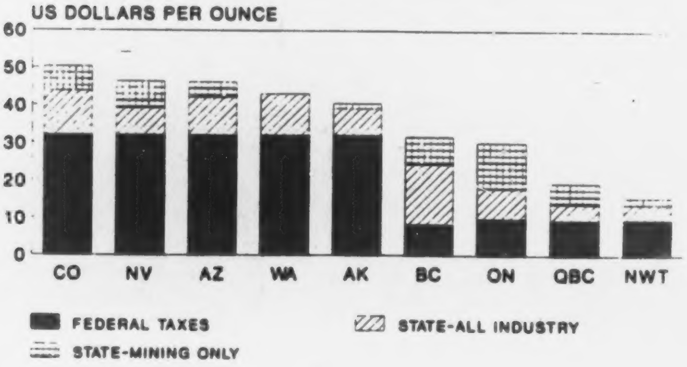
COMPARISON OF TAX JURISDICTIONS
PROJECT TAXES PAYABLE
TAXES PER OUNCE OF GOLD PRODUCED
U.S. $ 000
ASSUMING PASSAGE OF MINING LAW OF 1989

	AVERAGE	COLORADO	NEVADA	ARIZONA	WASH.	ALASKA	BRITISH COLUMBIA	ONTARIO	QUEBEC	NWT
FEDERAL TAXES										
FEDERAL INCOME TAX	2,656	0	0	0	0	0	5,265	6,320	6,112	6,204
FEDERAL SALES TAX	208	N/A	N/A	N/A	N/A	N/A	469	469	469	469
FEDERAL ROYALTIES (89 LAW)	12,356	22,240	22,240	22,240	22,240	22,240	N/A	N/A	N/A	N/A
TOTAL FEDERAL TAXES	15,220	22,240	22,240	22,240	22,240	22,240	5,734	6,789	6,581	6,673
FEDERAL TAXES PER OUNCE	21.90	32.00	32.00	32.00	32.00	32.00	8.25	9.77	9.47	9.60
PROVINCIAL/STATE TAXES										
TAXES ON INDUSTRIES:										
INCOME TAX	1,497	0	N/A	0	N/A	0	5,116	5,134	1,075	2,151
CAPITAL TAX	116	N/A	N/A	N/A	N/A	N/A	N/A	378	665	N/A
BUSINESS TAX	149	N/A	N/A	N/A	1,345	N/A	N/A	N/A	N/A	N/A
STATE SALES TAX	1,830	3,183	3,052	2,228	3,981	2,122	1,310	237	355	N/A
PROPERTY TAX	2,645	5,008	2,014	4,818	2,395	2,876	4,830	N/A	1,024	841
TOTAL	6,237	8,191	5,066	7,046	7,721	4,998	11,256	5,749	3,119	2,992
TOTAL PER OUNCE	8.97	11.79	7.29	10.14	11.11	7.19	16.20	8.27	4.49	4.31
MINING INDUSTRY TAXES:										
MINING TAX/ROYALTY	2,050	N/A	N/A	N/A	N/A	N/A	5,036	8,401	3,816	1,199
NET PROCEEDS	925	3,400	4,928	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SEVERANCE	544	1,132	N/A	2,821	N/A	941	N/A	N/A	N/A	N/A
TOTAL	3,519	4,532	4,928	2,821	0	941	5,036	8,401	3,816	1,199
TOTAL PER OUNCE	5.06	6.52	7.09	4.06	0.00	1.35	7.25	12.09	5.49	1.73
TOTAL TAXES	24,977	34,963	32,234	32,107	29,961	28,179	22,026	20,939	13,516	10,864
TOTAL TAXES PER OUNCE	35.94	50.31	46.38	46.20	43.11	40.55	31.69	30.13	19.45	15.63

TOTAL TAXES
PER OUNCE OF GOLD PRODUCED
CURRENT LAW



TOTAL TAXES
PER OUNCE OF GOLD PRODUCED
MINING LAW OF 1989



19-Apr-89

COMPARISON OF TAX JURISDICTIONS
TAXES BY YEAR
U.S. $ 000
CURRENT LAW

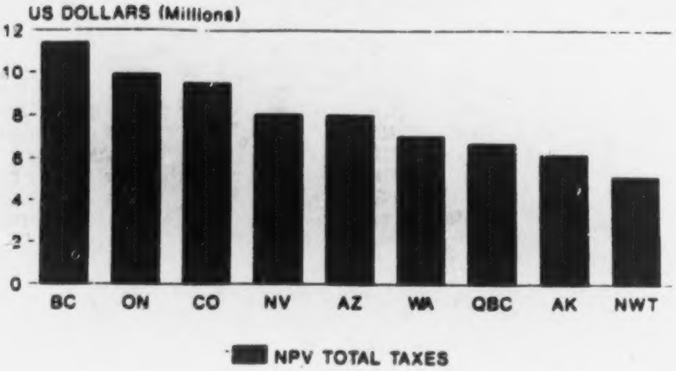
	1987 1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	TOTAL	N.P.V. 1/1/88 10%
OPERATING CASH FLOW	0	1,900	24,200	20,400	14,400	15,400	12,500	15,600	19,100	6,600	130,100	75,657
TAXES:												
BRITISH COLUMBIA	416	1,962	777	701	626	837	2,746	5,300	7,161	1,496	22,026	11,420
ONTARIO	199	714	99	51	22	1,363	3,021	5,875	7,753	1,842	20,939	9,952
COLORADO	677	3,118	1,508	1,617	1,130	1,140	950	1,192	3,859	197	15,386	9,530
NEVADA	564	2,308	1,432	1,639	850	818	604	1,296	3,633	0	13,144	8,089
ARIZONA	509	1,957	1,057	1,267	1,284	1,153	961	1,496	3,842	124	13,650	8,056
WASHINGTON	721	3,033	547	644	665	623	503	1,369	3,250	56	11,411	7,074
QUEBEC	304	1,100	339	236	167	110	650	4,090	5,366	1,154	13,516	6,729
ALASKA	437	1,901	438	401	414	1,165	411	1,467	3,955	229	10,818	6,213
NORTHWEST TERRITORIES	115	526	132	118	105	318	660	3,617	4,621	652	10,864	5,195

21-Jun-89

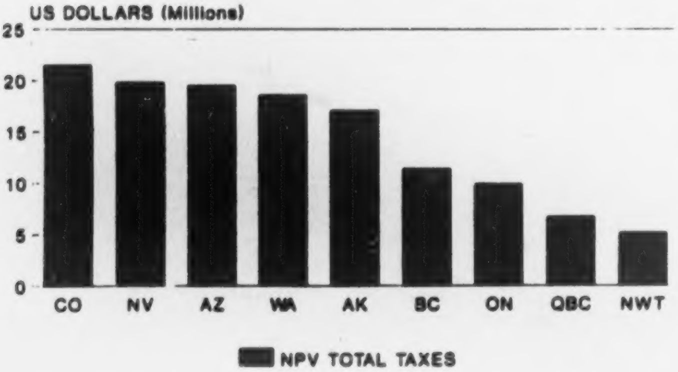
COMPARISON OF TAX JURISDICTIONS
TAXES & FEDERAL ROYALTIES BY YEAR
U.S. $ 000
ASSUMING PASSAGE OF MINING LAW OF 1989

	1987 1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	TOTAL	N.P.V. 1/1/88 10%
OPERATING CASH FLOW	0	1,900	24,200	20,400	14,400	15,400	12,500	15,600	19,100	6,600	130,100	75,657
TAXES:												
COLORADO	677	3,534	5,380	5,521	3,978	3,828	3,350	3,752	3,820	1,125	34,963	21,502
NEVADA	564	2,924	5,304	5,343	3,698	3,506	3,004	3,437	3,526	928	32,234	19,837
ARIZONA	509	2,373	4,929	5,171	4,132	3,841	3,361	3,493	3,246	1,052	32,107	19,529
WASHINGTON	721	3,449	4,419	4,548	3,513	3,311	2,903	3,167	2,946	984	29,961	18,578
ALASKA	437	2,397	4,310	4,305	3,262	3,169	2,811	3,098	3,233	1,157	28,179	17,076
BRITISH COLUMBIA	416	1,962	777	701	624	837	2,746	5,308	7,161	1,494	22,026	11,420
ONTARIO	199	714	99	51	22	1,363	3,021	5,875	7,753	1,842	20,939	9,952
QUEBEC	304	1,100	339	236	167	110	650	4,090	5,366	1,154	13,516	6,729
NORTHWEST TERRITORIES	115	526	132	118	105	318	660	3,417	4,621	852	10,864	5,185

NET PRESENT VALUE - 10%
TOTAL TAXES
CURRENT LAW



NET PRESENT VALUE - 10%
TOTAL TAXES
MINING LAW OF 1989

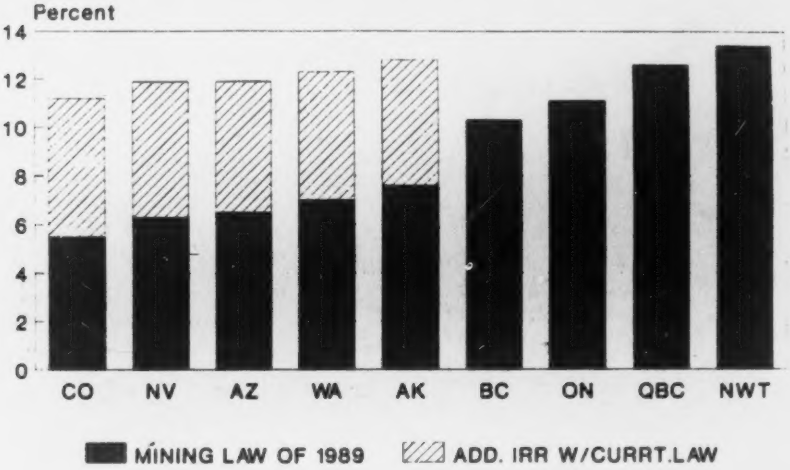


21-Jun-89

COMPARISON OF TAX JURISDICTIONS
INTERNAL RATE OF RETURN ANALYSIS
ASSUMING PASSAGE OF MINING LAW OF 1989

	(A) I.R.R. BEFORE TAXES OR FEDERAL ROYALTY	(B) I.R.R. AFTER TAXES BEFORE FEDERAL ROYALTY (CURRENT LAW)	(C) I.R.R. AFTER TAXES AND FEDERAL ROYALTY (1989 LAW)	(A-B) REDUCTION IN I.R.R. DUE TO TAXES EXCLUDING FEDERAL ROYALTY	(B-C) REDUCTION IN I.R.R. DUE TO FEDERAL ROYALTY
NORTHWEST TERRITORIES	15.6%	13.4%	13.4%	2.2%	N/A
QUEBEC	15.6%	12.6%	12.6%	3.0%	N/A
ONTARIO	15.6%	11.1%	11.1%	4.5%	N/A
BRITISH COLUMBIA	15.6%	10.3%	10.3%	5.3%	N/A
ALASKA	15.6%	12.8%	7.6%	2.8%	5.2%
WASHINGTON	15.6%	12.3%	7.0%	3.3%	5.3%
ARIZONA	15.6%	11.9%	6.5%	3.7%	5.4%
NEVADA	15.6%	11.9%	6.3%	3.7%	5.6%
COLORADO	15.6%	11.2%	5.5%	4.4%	5.7%

INTERNAL RATE OF RETURN
IMPACT OF MINING LAW OF 1989



ALLIGATOR RIDGE
Heap Leach & Milling Gold Project, Nevada

History

1976 - Property discovered by prospector Lyle Campbell
1977 - AMSELCO leased property, drilling commences
1978 - Feasibility and mine design
1981 - First production heap leach
1987 - Construction of CIL (Carbon In Leach) mill

Capital Costs

Initial:	$36.0 million
Mill:	5.5 million
Sustaining	10.0 million
Total	$51.5 million

Production

Year	Ounces of Gold	Direct Cost per oz. of Production	Average Annual Gold Price
1981	63,800	$233	$459.85
1982	61,200	230	374.96
1983	62,000	222	423.68
1984	62,200	215	360.68
1985	40,000	256	317.32
1986	75,000	180	368.02
1987	44,000	259	446.55
1988	47,200	300	437.00
1989 est*	50,000 est	300 est	375.00 est
Total	505,400	$238	$396.33

*Ore reserves are essentially depleted

Employment

129 people

ALLIGATOR RIDGE
Heap Leach & Milling Gold Project, Nevada

Economics

1981-1989:

Total Production:	505,400 ounces
Average Cash Cost:	$238/ounce
Average Price Realized:	$396.33/ounce

Total Revenue	$200,305,180
Cash Costs	120,285,200
Gross Cash Flow	$ 80,019,980
Capital Recovery	51,500,000
Gross Profit	$ 28,519,980
Nevada Mines Tax	1,425,999
Federal Tax (30%)	8,128,194
Net Profit	$ 18,965,787

Average Profit/year	$ 2,107,309.70
After tax Rate of Return	4.1%/year

Average Annual Payroll	$ 3,966,750.00
Average Annual Payroll Taxes	991,687.50
Total Payroll Taxes (life of project)	8,925,187.50

Summary:

Company after tax profit	$18,965.787
Federal taxes generated	17,053,382
State Mines Tax	1,425,999
Effective total tax rate	49.35%

ALLIGATOR RIDGE
Heap Leach & Milling Gold Project, Nevada

Assuming 8% Gross Royalty

1981-1989:

Total Revenue	$200,305,180
Cash Costs	120,285,200
8% Royalty	16,024,414
Gross Cash Flow	$ 63,995,566
Capital Recovery	51,500,000
Gross Profit	$ 12,495,566
Nevada Mines Tax	624,778
Federal Tax (30%)	3,748,669
Net Profit	$ 8,122,119

Average profit/year	$ 902,458
After tax rate of return	1.7%

Summary:

Company after tax profit:	$ 8,122,119
Federal taxes & royalty:	$28,698,271
State Mines Tax:	$ 624,778
Effective total tax rate:	78.3%

Statement prepared for the Senate Mineral Resources Development and Production Subcommittee of the

Senate Energy and Natural Resources Committee

by
Karl W. Mote
Executive Director
Northwest Mining Association

Draft Bill "Mining Law of 1989"

Washington, DC
June 7, 1989

Northwest Mining Association

1989 Officers:
President, **Ta M. Li**
Vice President and General Manager
Behre Dolbear-Riverside, Inc.
Vice President, **Mark A. Anderson**
General Manager
Asamera Minerals (U.S.) Inc.
Vice President, **David A. Holmes**
Exploration Manager, Industrial Minerals
Meridian Minerals Company
Vice President, **Karl W. Mote**
Northwest Mining Association
Secretary, **John L. Neff**
Attorney at Law
Neff, Naves, Phillabaum & Harlow
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Chief Geophysicist
Cominco American Resources Inc.
John A. Yellich
Manager - Site Assessments
ESPCI Co.

Hon. Jeff Bingaman, Chairman
Mineral Resources Development and Production
Subcommittee
Energy and Natural Resources Committee
SD-362 Dirksen Senate Office Building
Washington, DC 20510

Dear Mr. Chairman and Subcommittee Members:

Please accept this response for the record concerning Sen. Dale Bumpers' proposed replacement for the 1872 Mining Law. Mr. John L. Neff, attorney at law, mining engineer, and Secretary of the Northwest Mining Association will also present a statement on our behalf at your hearing on June 7, 1989.

The Northwest Mining Association was founded in 1895 in Spokane Washington to support the mining industry of the northwest. We have 2800 members, primarily in the western public lands states. Our membership is diverse, representing all aspects of the mineral industry. Although we have members interested in coal, sand, and gravel and other commodities, our our members are primarily interested in those minerals that are locatable under the 1872 Mining Law. Ours is an unrestricted membership, every member being equal and having one vote, and we therefore are not driven by one company or one commidity or one group. We therefore represent a true cross section of those dependent on the mining laws for our livelihood.

The proposed substitute for the 1872 Mining Law should not receive serious consideration in its present form. Others, including Mr. Neff, will point out the many technical and practical flaws in the proposal, but I wish to say simply that the proposal would kill all incentive to spend the great amount of time and effort needed to discover and develop minerals on the public lands. By making putting the government in the position of saying who may find and develop minerals, by limiting tenure to an impossibly short time, by assessing huge fees for the tenuous 'right' to explore and develop minerals, by instituting a royalty for an industry whose product prices are established by a world market and whose development time and cost are large and profit margins are small, this proposal would soon stop mestic mineral production.

Fortunately, it is not necessary to change the existing law to accomplish all the corrections you seek in present practice. The problems perceived with the existing law are in the administration of the law, not in the law itself. Except for the minuscule and incorrectly reported (GAO, March, 1989) issue of sale of fee lands on patented mining claims, all issues come down to inadequate application of existing regulations, or inadequate regulations curable within existing law.

In my testimony at the 1987 House hearings on proposals to amend the mining laws, I pointed out that the inconsistent, and often incorrect interpretation of mining regulations creates problems for the Agencies, the public, and the miner. Most often, the complaint is made that the mining law does not contain environmental controls. Not only is that true, but it is an access law, and can serve that purpose very well with proper administration. The environmental and other considerations are totally covered by other applicable law. To include environmental controls in a mining law would be redundant.

Proper administration means that the administering agency must first understand the law, the regulations, and the industry. Second, the administration must be consistent and correct, from one agency to the next, from one agency employee to the next, from one agency district to the next, and from one day to the next. For example, our organization has sponsored or participated in training for Forest Service minerals personnel for several years, but are frustrated by the fact that no line authority exists for the US Forest Service Director of Minerals and Geology. Without that authority, the November 1986 policy statement by the Chief regarding support and encouragement for mineral development on Forest lands is disregarded in favor of other uses or non-use by supervisors, none of whom are of minerals background. I am sure you will find that the minerals staff are usually as frustrated as the miners, but the difference is that the agency employees will survive all bad decisions, while the miner will not.

Again, the cure is entirely within the existing authority of the agencies. Continued training, coupled with infusion of experienced industry personnel, and making agency employees responsible for their decisions by demanding their correct application of regulations and policy, are essential to the proper administration of minerals on public lands. To assure a speedy conversion to this new management direction, the responsible senior mineral authority of each agency should review and sign off on every action regarding or affecting minerals, and the Government's own authority on minerals, the US Bureau of Mines, should assist the managing agencies by interpreting the effect of decisions on the ability to maintain a viable mineral operation.

National and agency policies to foster a healthy domestic minerals industry are meaningless when the agencies do not properly administer the laws and regulations. To replace a good law, badly administered, by a bad law, only promises to compound current problems. Certainly, our nation must not become more dependent on off-shore sources for minerals we can produce at home.

Finally, we strongly support Mr. Neff's proposal that, if changes to this vital and effective law are to be considered, the depth and importance demand that a review commission be created by Congress, co-chaired by the Director of the US Bureau of Mines and a member of the metal mining community, and including authorities from the public. The commission would be similar to the Public Land Law Review Commission in its structure, and would be charged with recommending to Congress whether the law needs revision, and if so, specific recommendations for revision. No other approach can yield adequate study or recommendations.

We urge that you leave the existing law in tact, and that you demand that the administering agencies reorganize their minerals efforts as we have recommended. We stand by to assist.

Sincerely,

Karl W. Mote

Karl W. Mote

(NON-PROFIT ORGANIZATION)

WESTERN MINING COUNCIL, Inc.

Testimony Before the U.S. Senate
Subcommittee on Mineral Resource Production and Development,
of the
Committee on Energy and Natural Resources
Hon. Jeff Bingaman, Chairman

Review of the U.S. Mining Law and Proposed "Mining Law of 1989"

Presented by
Robert A. Sanregret, A.B., M.B.A., J.D.
Representative of the Western Mining Council, Inc.
at
Washington, D.C.
Date: June 7, 1989

Mr. Chairman and Members of the Subcommittee:

Thank you for allowing the Western Mining Council to present its views in opposition to the "Mining Law of 1989" and in opposition to the nationalization of U.S. mineral exploration and mining on public land by changing the current U.S. 1872 Mining Law, as amended, from an incentive location system to a leasing/fee system.

The Western Mining Council is a group of independent smaller-scale miners and prospectors, with many owner-operators. Our members are active throughout the United States, primarily in Western U.S. mining states.

The current amended 1872 Mining Law is aptly dubbed "the premiere remaining example of free enterprise in the U.S." It is ironic that just as I was preparing this testimony in support of our free enterprise Mining Law, the Chinese massacred hundreds of their own students for demanding U.S.-style freedoms, and the Chinese Army destroyed the replica of our Statue of Liberty in Bejing.

The 1872 Mining Law, as amended, today creates an effective system of identifying and inventorying minerals on public lands at no cost to the public. The heavy-handed "fee/lease system" proposed under the "Mining Law of 1989" would put most most mineral and exploration individuals and companies in the United States out of business. Only the largest and strongest operating mines would survive the outrageous confiscatory fees under the "Mining Law of 1989"; and, then, only because those companies would have no choice other than to knuckle under.

The present exodus of large and small mineral producers out of the U.S. would obviously accelerate under the nationalization of the "Mining Law of 1989" -- to China, Turkey, Mexico, Canada, etc. This exodus was caused by zealous over-regulation in certain areas, to the loud cheers of the radical environmentalists whose Utopian goal is no development, no building, no dams and no mines in the United States, after which we just increase our purchases of palladium, talc, iron ore and oil from overseas. Is this an overstatement? Please consider the recent exodus due to a combination of environmental and economic pressure:

(1) We are now overpaying for Chinese talc. In 1987 the largest talc mine in the U.S. was closed because of economic and environmental pressures, the equipment was loaded into containers and shipped to Mainland China; and we are no longer exporting talc, but are now im- porting processed talc from China, to the detriment of our trade balance, local jobs and our standard of living.

(2) We are overpaying for Japanese steel. When the Eagle Mountain Iron Mine (Riverside County, California) closed in 1982 due to Kaiser's economic problems and environmental pressures, the Japanese immediately stopped dumping steel in the U.S. and raised their steel prices substantially to just below the Chicago price plus shipping. Most West Coast steel today is purchased from Japan at increased prices, unless the buyer chooses to pay an additional premium to "buy American". The tragedy of the Eagle Mountain Mine is that millions of tons of usable iron ore are lying fallow and readily available in California, while we buy our steel from Japan at inflated prices.

(3) We are overpaying for Turkish fiberglass. Colemenite is a major component of fiberglass, and was mined in the U.S. only in California until recently when the mine closed; and our major supplier of colemenite is now in Turkey. Hopes of reopening the California mine will disappear under the proposed Mining Law of 1989.

The above three examples of recent mines forced to close through environmental regulations and economic pressure will be multiplied many-fold if mineral exploration and mining are nationalized by the "Mining Law of 1989."

The "1872 Mining Law" has been amended many times since 1872, resulting in the present self-initiation system of mineral exploration and development on public land. The changes from the rough-and-tumble days of the 19th Century include tight regulation of equipment, chemicals, excavations and reclamation. However, the core of the 1872 Mining Law remains, and that core is the incentive system whereby a U. S. citizen can explore for minerals on public land; and if the citizen discovers a valuable mineral deposit, he may develop a mine -- subject today, of course, to the state and federal regulation of the mining activity, environmental effects and reclamation. The 1872 Mining Law also created Mining Districts as miners' self-regulating entities. Many mining districts are functioning today, some even predated the 1872 Mining Law; but, federal Mining Districts would be destroyed by the Mining Law of 1989.

Today there are thousands of citizens who regularly venture to the deserts and mountains of the Western U.S. in search of a new mineral discovery. Instead of a burro, the 1989 mineral prospector has a 4-wheel-drive vehicle and perhaps a metal detector or magnetometer; but, the prospector or "explorationist" today still uses the pickaxe and gold pan to find and examine clues to his prospective new mineral discovery.

The heart of the current Mining Law is that when Mr. Citizen discovers a mineral deposit, he may file a claim by recording a Location Notice or Discovery Notice, which protects his mineral discovery, and the law allows Mr. Citizen to develop and mine his claim to the exclusion of all others. There are approximately

400,000 such "Discovery Notices" recorded in California and Nevada alone. Obviously, only a few of these "discoveries" will pan out. (That is not a pun. The phrase "panning out", of course, originated from references to the 49'ers gold pans.)

The U.S. citizen-owner of a valid mining claim owns a fee simple real property interest in that piece of public land, described in legalese as a "fee simple subject to a condition subsequent". The "condition subsequent" is the claimholder's obligation to perform a certain amount of operational or development work on the mining claim annually to continue to own his real property fee simple interest. Also, the citizen claimholder must share the surface of his property with other persons (citizens and non-citizens) under the "multiple use" concept, so long as these visiting non-claimholders do not take any minerals from the mining claim. Since the U.S. Forest Service, Park Service and BLM regulate surface uses, the present complex bureaucratic turf war would be made hopelessly expensive and unmanageable for the private citizen claimholder under the proposed 1989 Mining Law.

Most major mines and hundreds of mining operations were started and mineral deposits discovered in the Western U.S. by individual U.S. citizens exploring for minerals under the U.S. 1872 Mining Law. To destroy this immense and valuable resource would also destroy the current efficient process of identification and inventorying of minerals on public land.

Please consider the following three world-class mines, all of which was discovered by individual independent prospectors under the current incentive system of the 1872 Mining Law. Each of these three major mines is discussed briefly below:

(1) "Mountain Pass Mine": In April 1949 Herbert Woodward and James Watkins borrowed a geiger counter from "Pop" Simon and set out looking for uranium in San Bernardino County, California. They found radioactive rock, had it analyzed by the Bureau of Mines who identified the mineral bastnaesite, a rare earth. Molycorp bought the claims from the original prospector/locators in 1950. In 1951 there were very few uses for rare earth metals. Molycorp research labs were able to develop uses for the rare earth metals and develop markets for their ore. Today this Mountain Pass Mine contains the largest deposit of its kind in the world. The use of and need for the rare earths in the current superconductivity "boom" is critical.

(2) "Mesquite Mine": Dick and Anna Singer prospected and staked their first mining claims in the Mesquite Mining District in Imperial County, California, in the 1950's. After years of work and acquiring additional claims in the area, the Singers approached major mining companies, several of which sent geologists to examined the claims and took samples, only to reject the property. On a personal note,

Mr. and Mrs. Singer were friends and clients of mine on several Mining District matters, I had discussed the 1872 Mining Law with Anna Singer, who was planning to appear to testify before this committee; but, she passed away in April 1989. In 1980 geologists from a Gold Fields Mining Corp. examined the Singers' property, leased it, conducted extensive exploration and feasibility studies, and in 1986 achieved full scale production from a deposit that dozens of geologists and federal and state agencies had previously said was "non-economic." Current production from the Mesquite Mine is approximately 200,000 Troy ounces of gold annually (about $80-million), employment is about 300 persons, and the annual payroll is over $6-million.

(3) "Boron Mine": In 1913 Dr. John Suckow, an individual homesteader, discovered borate minerals while drilling a water well in Kern County, California, in the Mojave Desert. U.S. Borax Co. acquired the property and started production in 1926. Since that time this deposit at Boron, California, has annually yielded more than 60% of the free world's borate production.

The operating mines discussed above are only three of the largest of hundreds of mines in the Western U.S., most of which were discovered by individual independent prospectors. These deposits were discovered by people who were looking in areas not known to contain deposits, or where it was thought to be subeconomic at best. Many more prospectors have discovered deposits that became operating mines. The incentive these prospectors have is the U.S. Mining Law which provides an opportunity for citizens to enter public land and to prospect for minerals. The 1872 Mining Law provides incentives in that if a person finds a mineral deposit on public land, that person can develop a mine and ultimately acquire a patent to the property. There is no up-front subsidy by the federal government. There is no "subsidy payment" for not prospecting, nor is there payment for not producing. Obviously only a small percentage of mining exploration prospects result in a profitable mine. However, the successful prospector's reward for a productive job well done, for discovering a valuable mineral, is the prospector's assurance under the U.S. Mining Law that the mineral deposit can be developed. These major mines in the Western U.S., and many others elsewhere, would not have been discovered and developed without the incentive of the 1872 Mining Law; and there are thousands of persons today, and several in this room, who regularly go out prospecting for minerals on the public lands of the Western United States.

The costs of not producing minerals and of not finding more new mineral deposits can only be estimated. If the Colosseum Mine at Clark Mountain (San Bernardino County, CA) were restricted or closed, 100 to 150 jobs would be lost that would have supported approximately 400 people. If the gold deposit in the Castle Mountains area near Hart, in San Bernardino County, were closed, another 100 to 200 jobs would be lost. Annual payrolls of from $3-million to $6-million at each mine would be lost, along with the support and service industries that would have benefited from just these two deposits. The costs for restricting exploration and mining would be great, far greater than the short-term excessive and restrictive "fees" which would be collected under the Mining Law of 1989.

Importing a mineral from a foreign country rather than exporting it from the United States increases the U.S. balance of trade deficit. At a time when our nation needs to stimulate the creation of new jobs, to improve our trade deficit and to further strengthen our economy, the nationalization of mining and the deliberate destruction of our present incentive mining system would operate counter to each of these important economic objectives.

If the Mountain Pass Mine in California were to close, our rare earths would have to be purchased from China. In the U.S. we have strict environmental controls to protect the air, water and land. These same controls are virtually non-existent in China; so, by increasing mining in China, at the expense of decreased mining in the U.S., the world environment would suffer, the U.S. trade deficit would suffer, and the U.S. would still pay more, possibly much more, for the very same minerals which would lie undeveloped on Western U.S. public lands.

The fiscal impact and dollar cost, of the "Mining Law of 1989" would be tremendous -- far above the temporary short-term "cash flow" into the public coffers from the excessive fees under the 1989 Bill. Please consider the following summary of the substantial cost to the U.S., and to the U.S. citizens, which would result if the proposed "Mining Law of 1989" were to become law:

Cost #1 -- Increased Prices of Minerals. The purchase price or cost of many minerals, rare earths and critical minerals will rise over the short term, and skyrocket over the long term, because of the disappearance of the supply and identified future sources of these minerals from the U.S. public lands. The U.S. government and businesses would be dependent upon and subject to the foibles of, and price gouging by, foreign sources of many essential and critical minerals, such as we were in the oil "shortage" of the 1970's. The only other major sources of colemenite and boron are in Turkey, and the rare earths are available primarily from Mainland China and from eastern bloc countries. As discussed above, today we are buying processed talc from China, iron from Japan and colemenite from Turkey, to name a few, at increased costs. Meanwhile, our readily available U.S. mineral deposits of talc, iron ore and colemenite "lie fallow" on Western U.S. public land; and we are paying excessive prices for steel for our buildings, fiberglass for our boats and talcum powder. Please do not make it worse by enacting the Mining Law of 1989.

Cost #2 -- Fifth Amendment "Takings." Billions of dollars of eminent domain awards will likely be due to the present owners of mining claims and businesses which will be "taken" if the mining claims become worthless because of the 1989 Mining Law or the "regulations" which would implement the law. The U.S. government would be looked to for compensation for such inverse condemnation "takings" under the 5th Amendment, as reaffirmed in recent U.S. Supreme Court decisions. In 1980 a federal lease which had been restricted by wilderness protection regulations was held to be a mere "shell" lease, and a compensable "taking"; and existing mining claims which are subjected to new restrictions would also seem to be a "taking" of real property requiring compensation under the 5th Amendment.

Cost #3 -- Non-Compensable Losses. Thousands of businesses, large and small, would be hurt or destroyed by the Mining Law of 1989, with many of these private losses being non-compensable under the 5th Amendment; e.g., mining and prospector supply shops, private exploration and mining development companies, service industries, vehicle sales and service, and, of course, the thousands of future mineral prospectors who will never get a chance to "strike it rich."

Cost #4 -- Dependence Upon Unreliable Foreign Sources for Minerals. The most serious "cost" of the nationalization of mining under the "Mining Law of 1989" would be our increased dependence upon and subservience to foreign, unreliable and unfriendly sources of minerals, particularly for essential minerals and rare earths, which are indispensable to keeping our dominant position in the critical fast-developing areas of military hardware, space technology, nuclear fusion and superconductivity. We would be unable to keep our "edge" if an unfriendly foreign cartel chose to not sell us their minerals or rare earths. No dollar value can be placed upon the U.S. retaining its position as the world leader in research, security, high-technology and national defense. The list of affected minerals is long and varied, including: Iron ore, rare earths, boron, palladium, other the platinum group minerals, precious metals, talc, titanium, chromium, etc.

Conclusion:

The U.S. mining and exploration business should not be nationalized by "The Mining Law of 1989". The 1872 Mining Law, as amended, works well today in locating and inventorying the minerals and mineral reserves on our vast U.S. public lands. To destroy the present incentive location system in favor of nationalized exploration "administered from afar", with excessive "fees", would emasculate thousands of exploration and mining businesses by eliminating established self-initiation system which works so well, at no cost to the public. As you have heard before relative to the 1872 Mining Law, but which is quintessentially appropriate: "If it ain't broke, don't fix it."

Thank you for allowing the Western Mining Council to present its views in opposition to changing the U.S. Mining Law, and in particular in opposition to the "Mining Law of 1989."

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Testimony Before the U.S. Senate
Subcommittee on Mineral Resource Production and Development,
of the
Committee on Energy and Natural Resources
Hon. Jeff Bingaman, Chairman

Review of the U.S. Mining Law and Proposed "Mining Law of 1989"

testimony of Donald L. Fife

at
Washington, D.C.
Date: June 7, 1989

The 1872 Mining Law Is A National Asset

Mr. Fife is past president of the South Coast Geological Society, current chairman of the Mining Advisory Board for the National Inholders Association, and since 1981 has been the Secretary of Interior's appointee for geology, energy and minerals on the Bureau of Land Management's California Desert Multiple-Use Advisory Council.

The National Inholders Association represents those people owning private land and other interests within federal boundaries including all miners holding vested interests under the 1872 Mining Law. NIA has over 15,000 members in 50 states and 200 federal areas. There are an estimated 1.2 million inholders nationwide in addition to more than 1 million mining claim owners and small explorationists.

A way of life for hundreds of thousands of citizens and a national asset for America would be severely impacted or destroyed by imprudent changes to or destruction of the present location system under the mining law of 1872.

The location system has worked well for more than a century, providing American consumers and society with important locatable mineral commodities. This system is functioning well and we see no need for changes. As has been said many times before: "If it ain't broke, don't fix it."

Mineral inventory or assessment of large areas must consider not only the dynamics of geology and mineral economics, but to be meaningful to society, must consider all present and future mineral commodity demands for agriculture, manufacturing and national defense. Until such insight is possible, no final mineral inventory or assessments can be made. Therefore, it is rational and prudent for American society to leave open to mineral location as much area as possible. The 1872 Mining Law continues to serve this nation well for assessing locatable minerals on the public domain.

The independent small-miner/prospector/geologist/explorationist is not obsolete in the exploration/assessment process. In view of lack of federal, state and acedemic mineral resource studies and support during the last few decades, the majority of the recent discoveries would not have been made without the small miner and independent explorationist.

However, this should not be too surprising since the history of the West is in large part a history of discoveries by the small miner/prospector. Most individual miners and large resource companies identify the majority of their exploration targets either directly from the small explorationists or from evidence of their previous efforts under the location system.

In effect, the 1872 Mining Law has produced an army of thousands of citizens in which the free enterprise system continually "explores and assesses" our open federal land.

Most successful major and many small mining operations were reviewed and explored by dozens of mining companies or private individuals over a period of years before someone made the commitment in dollars and cents to risk making a "mineral discovery" an operating mine. Without the incentive and potential for ownership under the 1872 mining law most of these efforts would never have taken place.

Right now we are having our nation's mineral resources assessed and "inventoried" by small prospectors and geologists. Having the right to look and dream of striking it big provides the incentive for these people to continue exploring. Sometimes they make big discoveries but without the encouragement and incentive provided in the law, they wouldn't do it. They couldn't do it.

For example, Dick and Anna Singer, a mom-and-pop prospecting team (he is a disabled World War II veteran) worked a claim for 30 years that was thought to be marginal property. It was in the same general area where the Spaniards found gold in 1780 on their way to California. This same area was explored and walked over by hundreds, perhaps thousands of prospectors, miners and geologists for the past 200 years. Dick and Anna Singer were barely eeking out a living but believed in the site and sought some help to develop it.

After being turned down by numerous mining company geologists who felt the land was less than marginal, they found one major company to come in with them. The company came into the project despite a University of California Ph.D thesis which indicated the land was less than marginal. The company went down 280 feet and blocked out a major world class gold discovery in excess of a billion dollars. Without the incentive provided in the law, this discovery would have never happened.

Without the 1872 mining law, accidental discoveries like the world class borate discovery at Boron, California, or the world class rare earth lanthanide deposit at Mountain Pass, California, would tend not to be reported let alone developed. The long term effects of replacing the mining law would also be profoundly negative: it would seriously impact our ability to find and produce locatable critical and strategic mineral commodities. America could lose the small independent explorationist, his expertise, and knowledge of America's mineral wealth.

In the Eastern California Desert is the rare earth deposit at Mountain Pass where, in 1949, most of the Western world rare earth lanthanides were discovered by three uranium prospectors, Herb Woodward, Jim Watkins, and "Pop" Simon. This discovery is in a belt several thousand feet wide and several miles long and perhaps three thousand feet deep. The Sulfide Queen gold mine operated for years almost on top of the rare earth body without knowing it. Hundreds of prospectors, as well as dozens of company and government geologists had walked over it while millions of motorists drove over it on their way to California.

There was suddenly so much rare earth lanthanides, as well as no known way to process it, that the deposit would not be considered economic and therefore not a valid discovery under today's mining laws and excessively strict rules of marketability. As in practically every mineral discovery, it took considerable capital (millions of dollars) to make the deposit economical. Without the 1872 Mining Law, the small prospectors would never have been out prospecting in the first place. It is also doubtful that the investment of millions of dollars in research to make an unknown mineral commodity economical would have been made without ownershop guaranteed under the 1872 Mining Law.

In 1980 Warren Warhol, in the South Coast Geological Societies *Geology and Mineral Wealth of the California Desert,* notes "that many of the uses of rare earth lanthanides were developed only after their commercial availability was demonstrated on a scale which was only made possible by the discovery of the Mountain Pass ore body. The research and development that followed created the economic value of this unique ore body."

It is easy to overlook the significance of this order of events: that is, the discovery value by small miners and its contribution to the technology of chemistry, metallurgy, glass, petroleum refining and electronics. The lesson to be learned: if this area had been closed to the 1872 Mining Law in the past, not only would the benefits from this resource have been postponed or lost, its value would still be unestablished.

This single discovery has made the United States the predominent world producer of rare earth lanthanides, such as europium, which activates crystals of yttrium to produce red color in television picture tubes; and samarium and neodymium which, when alloyed with other elements, produce a super magnet so powerful that when used in the conventional electric motor, increases its efficiency by 25 to 50%. With the coming lightweight battery technology, these metals may be a significant factor in the development of a pollution-free automobile.

The rare earth lanthanides—lanthanium, cerium, neodynium, praseodynium, samarium, gadolinium, europium, and some ten others are in the forefront of elements promising a new age of superconductivity and super magnets which, according to the May 11th, 1987, issue of *Time* magazine, could bring a better environment and quality of life to America via clean fusion energy, vastly more efficient electrical power transmission and smogless, quieter electric automobiles. The availability of these elements is also playing a role in the development of the Strategic Defense Initiative (SDI). This technology, and the only principal known reserve of this rare earth lanthanide in North America, we owe to the original discovery by "Pop" Simon, Herb Woodward, and Jim Watkins, exploring under the 1872 mining law.

A Leasing System Is Not In The Best Interest Of The Nation

It concerns us greatly that many of the same groups that would like to sack the 1872 mining law in favor of a leasing system are the same groups promoting vast closures of the federal lands to society's access for minerals.

There appears to be an effort to influence public policy on mineral access with little understanding of the disastrous effect on America's economy.

On California's federal land (50% of the state) as well as other federal land states, little in-depth regional research has been undertaken by the government or academia since the 1960s. In Southern California the last comprehensive work on the geology of the region was in *Geology of Southern California—Bulletin #170 of the California Division of Mines and Geology—1954.* The last documentation of individual mineral resources or commodities in the region are usually found in the "California Journal of Mines and Geology" dating from the 1940s or 1950s. The last comprehensive statewide summary of mined resources was in *Mineral Commodities of California—Bulletin #176 of the California Division of Mines and Geology—-1957.*

The mineral data base upon which government and private industry are making their decisions today is commonly more than 30 years out of date.

Mineral exploration is the R & D of the mineral industry. Regional economic geology and mineral commodity studies are the foundation of mineral exploration. The lead time to open a new mine now commonly exceeds 20 years or more. Basic state of the art regional geologic and specific mineral commodity studies are necessary to keep the United States competitive with the rest of the world and to maintain our standard of living. Composing only about 5% of the world's population, Americans consume about 20% of the world's non-fuel minerals. Each American requires on the order of 40,000 pounds of new mineral commodities each year just to maintain his or her standard of living.

Presently, as well as during the past three decades, prospectors, independent geologists, and private companies operating under the 1872 mining law, have been the major force in exploring and assessing locatable mineral resources on the federal lands.

Unlike oil or geothermal resources, locatable minerals cannot be produced from the same drill hole that was used to explore for energy resources. Locatable mineral commodities tend to require vastly more ingenuity and risk to find and develop. Many deposits are one of a geologic kind: for example, the Mountain Pass rare earth lanthanides deposit, the borate deposit at Boron, California, or the hectorite lithium-floride clays near Barstow, California.

Discretionary leasing on such unique geologic occurrances or even more well-known geologic models in unique or complex geologic environments will tend to be given low priority or no priority for prospecting permits or leases because we professionals have been lead to believe through our training that a deposit "should not" be there. Many discoveries have been made under the 1872 Mining Law because the individual prospector or explorationist was "too dumb" to know they shouldn't be looking in that environment! The current rush to close and withdraw from mineral entry huge land areas for Wilderness, parks or other special designations has led to some irrational conclusions by government agencies on the mineral potential of the included federal lands.

One of the best examples of this is the misinformation placed in the Congressional Record of April 6, 1987, by Senator Alan Cranston supporting his California Desert Wilderness and park legislation-S.11. He said: "The major mineral commodities now being produced in the California Desert are sand and gravel. The California Desert has been intensively prospected for 100 years. Most studies show that there is little remaining commercial developable mineralization in the California Desert."

Obviously the senator has been misinformed. According to the public records of the California Division of Mines and Geology and the U.S. Bureau of Mines, the California Desert is a leading source of non-fuel mineral production for the State of California and for the nation: 1) Total non-fuel mineral production in California for 1986 was $2.3 billion of which $1.2 billion came from the California Desert; 2) Total sand and gravel production for California for 1986 was valued at $545 million of which less than 5% is produced in the California Desert. This amounts to about $27 million, or only 2% of the total mineral production of the California Desert; 3) 100% of the nation's boron minerals are mined in the California Desert and in 1986 were valued at $430 million; 4) 97% of the nation's rare earth mineral production comes from the Mountain Pass Mine in the California Desert. These rare earth lanthanides are used in several high technology applications, including super magnets, lasers, and the recent breakthrough in superconductivity which may hold the key to future advances in energy conservation; 5) more than 200,000 troy ounces of gold were mined in the California Desert in 1986.

In a 1978 report by the U.S. Bureau of Land Management geologists it was estimated that the California Desert contained only a little more than 3 million ounces of remaining gold according the the *U.S. BLM 1978-California Desert Plan, Mineral Appendix (XIV-Vol. G)*. As a result of small prospectors and private exploration efforts under the 1872 Mining Law there has been a dramatic increase in gold discoveries and production in the region. Production has increased from 5,000 ounces in 1981 to more than 200,000 ounces in 1986. New gold mines are being developed that would increase that to 255,000 ounces in 1987 and 305,000 ounces in 1988.

Contrary to Senator Cranston's perception, there have been very few, if any, real in-depth regional studies for economic minerals other than those of individuals and companies working under the incentives of the 1872 mining laws.

Another recent example of the misperception by the public and Congress of mining and mining claims and their impact is reported by the General Accounting Office in their report, *Mining on National Park Service Lands—What Is At Stake?* Park Service officials testified before Congress that there were 50,000 mining claims in Death Valley National Monument and the "monument was in danger of being strip-mined away." After Congress passed the Mining in the Parks Act in September, 1976, freezing mining in Death Valley National Monument, it was found that the 2.2 million acre monument only contained 863 mining claims under the 1872 law.

Unfortunately, out of approximately 500 small mining claimants, only 2 unpatented claim groups (Bullfrog and Skidoo-Del Norte) had the resources to defend themselves from what GAO labeled as a biased invalidation process by the Park Service. These valuable deposits undoubtedly would have been wiped out if they had been granted a lease under a leasing system, just as local cattleman Roy Hunter was wiped out on his grazing lease after his family had been in the Death Valley area for more than 100 years.

Parenthetically, the rancher was thrown out after maintaining the range in good condition for a century and the Park Service, with its policy of non-management, allowed the ferral burro population to destroy the range creating a huge dust bowl.

Another example of government planners and geologists ignorance of mineral resources is shown by the 1986 U.S. Forest Service 15-year plan for the San Bernardino National Forest in California. The plan stresses the $6.6 million per year benefit from wood products, tourism and recreation in the forest. Mining and mineral potential are practically ignored except that several areas of high grade mineral potential are proposed for withdrawal from mineral entry. The reason usually cited for the mineral withdrawal is because of some alleged sensitive or rare or new plant sub-species.

As one whose major in college was paleontology, I make the observation that none of these new alleged sub-species has undergone the appropriate peer review to be listed as such or so as to be described as a new sub-species. However, the environmental smokescreen is being used to curtail the miners' exploration and society's access to the mineral resources on National Forest lands.

If a leasing system were used it would create an open season for undocumented subjective and politically motivated decisions based on so-called environmental grounds that would make most of the mineral discovery and development process uneconomical. Protections included in the 1872 Mining Law that keep the exploration process even marginal, in the face of incremental entry withdrawals plus constant harassment and pressure from the Forest Service and other land agencies, would be completely wiped out under a leasing system.

An astonishing oversight by Forest Service planners was the total omission of the fact that this National Forest contains the Lucerne Valley Limestone District, the largest high grade limestone district in the Western United States producing about 3.5 million tons per year, or about $200 million per year in limestone products. This district generates thousands of jobs and millions of dollars in federal, state and local taxes.

It is also interesting to note that the largest single owner of patented and unpatented mining claims in this district is the 6,000 co-beneficiaries of the local AFL—CIO Union Health Insurance and Pension Trust Fund (Cushenbury Trust). Conversion of their unpatented mining claims to leases would be a severe blow to these inholders and their ability to pay old age pensions and medical bills.

There is a tendency for the public and the bureaucracy to view society's need for resources in a one dimensional static framework such as Senator Cranston's statement that the land has been prospected for more than 100 years and the implication that everything has been found. His statement reminds us of the mindset in the U.S. Patent Office in the 1870s which thought the patent office should be closed because everything worthwhile had already been invented.

In reality, rapidly changing economics and technology continually change the kinds of minerals that are sought and the grades that are economic. According to Vincent McKelvey (1976), former director of the U.S.

Geologic Survey (1972-1978): "Mineral reserves and resources are dynamic quantities and must constantly be appraised. As known deposits are exhausted, unknown deposits must be discovered, new extraction technologies, and new uses are developed and new geologic knowledge logic environments are favorable for mineral discoveries." We maintain the 1872 Mining Law is an important part of this assessment process.

There is a real danger that prospecting permits or leases for locatable minerals would tend not to be granted until the deposit is "proven." Of course, it may not be proven until an individual or company has a possessory interest that gives the incentive for risking large sums for exploration. This would tend to become a "catch 22" situation.

The leasing system on state lands for locatable minerals belonging to the State Teachers Pension Fund in California has been a total failure. Virtually all explorationists, large and small, have given up on locatable occurrences on these lands because of the lack of incentives and ownership of the mineral estate. It should also be noted that ownership of the land after mining is completed is one of the greatest incentives for reclaiming the land after mineral extraction. In California and other western states there are existing strict reclamation statutes.

The 1872 Mining Law Is America's Secret Weapon In Competition With The Soviet Union

In a 1940 speech, Olaf P. Jenkins, the chief geologist for the California Division of Mines, recognized the critical concept which was soon to be tested by the impending Second World War: "No nation on earth possesses all the various minerals needed. In time of peace, to overcome this deficiency, the necessary deficient minerals are imported. In time of war, however, restriction of importation may be so serious to certain industries of a nation as to cripple that nation both from a military standpoint and from the standpoint of internal development.

"Present day national defense should not and does not consider military defense alone, but is studying with great care that possibility (which may turn out to be much more serious) of economic warfare, should the balance of power become so unbalanced as to leave one power to dominate the earth. This could come about should one power possess all the various minerals needed in all of its industries.

"It behooves us all, therefore, who are in this work of studying minerals, their origin, development, and their significance to the growth and existance of a nation, to look toward the strategic problems of national defense as in large part, the problems of the mineral industry."

These concepts are just as true today as they were in 1940, and they will be for the forseeable future. However, the Soviet Union, with one sixth of the world's surface area, and the largest mineral resource base of any nation, is precariously close to possessing all of the various minerals needed to become independent of other nations.

As the Soviet Union, with its nearly three fold advantage in land to find mineral resources, expands into the vast expanse of Asia, it will likely reach total self sufficiency in strategic and critical mineral resources.

Even gold has become a strategic commodity. In time of international crisis or war, gold may be the only acceptable currency. Each commercial or military jet requires a significant fraction. The chrome-steel jet engines are welded together with gold-nickel alloy which is highly resistant to vibration and metal fatigue. A thin layer of gold is sandwiched in the aircraft windshield so low voltage current can be trickled through to de-ice the windshield.

An ordinary 747 requires about 150 ounces of gold for its construction. Gold is also in great demand for electronic components, space probes, the space shuttle and satellites.

The Soviet Union has almost three acres for every one we have. Yet they have so much bureaucracy and lack of incentives that most of their resources are not developed. We should be thankful that they don't have the 1872 Mining Law like ours or their economy could well surpass that of the United States.

But here we have people who want to remove our incentives and thus our exploration and development advantage which will make us increasingly dependent on foreign imports. Those people don't really understand the free enterprise system and the deeper philosophical statements made by the 1872 Mining Law. It is uniquely American.

When it comes to locatable minerals, the 1872 Mining Law is America's secret economic weapon in competing with the overwhelming Soviet advantage in mineral resources. It should be kept in mind that long term economic stability and military survival favors the society with the most diverse, accessible, productive, and secure mineral resource base.

The 1872 Mining Law has been serving this end for more than a century. The National Inholders Association sees no compelling reason to change the law. ☐

Support the 1872 Mining Law

Leshy's Insidious Attack On U.S. Freedom and The Mining Law

by Robert A. Sanregret

The Western Mining Council and NIA Mining Advisory Board

A particularly insidious book has hit the halls of Congress and the bookstores. This book is entitled *"The Mining Law: A Study in Perpetual Motion"* by John D. Leshy, of ASU Law School. The short title of this book is, deceivingly, *"The Mining Law"*.

Being a lawyer, I was somewhat interested in examining this new "mining law" book by an ASU Professor. However, I was outraged when I read Leshy's book and immediately saw that it was not a "law" book, but, rather, a slick and insidious attack on the laws and practices of our great country that have developed the Western U.S. since 1849. This book is insidious in that it "explains" the U.S. mining laws and practices strictly from the view of a "lock-it-up" super-environmentalist. The book is written in an entertaining and readable style, but Leshy writes under the bad-faith guise of a scholarly analysis and a "legal treatise", while presenting a grossly distorted view of the U.S. Mining Law and its benefits to America.

The 1872 Mining Law is a federal statute based upon the mining laws and practices of the 1850s and 1860s in the Western U.S. The Mining Law established a system of self-initiated mineral exploration which allows and encourages U.S. citizens to prospect for minerals on public land in the Western U.S. Also, most Western states have their own laws substantially affirming these rights of U.S. citizens under the federal Mining Law.

A U.S. citizen who discovers a mineral deposit on open public land may "locate" or "stake" a mining claim under the Mining Law, which then gives this "locator" the right to extract the minerals from the claim which he has staked. The process works today, just as it did in the 19th Century, to encourage mineral exploration and development on public land. This system of self-initiation is even more significant today with the exploration tools and transportation in use today being much more efficient than in the 19th Century. There are thousands of individual citizens today who are prospecting and searching the out-of-the-way areas of the U.S. deserts and mountains for minerals, precious metals and rare earths. This country's primary source of mineral properties today is the individual citizen-prospector who locates a mining claim upon which he has made a valuable mineral discovery.

Professor Leshy mischaracterizes the "incentive system" of the 1872 Mining Law, and the $2.50-$5.00/acre fee for patenting, as a giveaway of land by the federal government. However, Leshy fails to observe that the prospector may have "earned" his right to the minerals because of his initiative and his discovery of the minerals. Professor Leshy further fails to point out the fact that the actual cost of developing and patenting a mining claim is over $2,000/acre—the $5.00/acre being merely equivalent to a filing fee.

It is true that the federal government does not receive a "sale price" for the patented land, *but* it is *not government land*, it is *public land*. The good Law Professor Leshy apparently forgot, or ignored, the 10th Amendment's clear provision that rights not expressly granted to the federal government belong to the states or *to the people*—including the right to explore and develop minerals on public domain lands. You might briefly review your U.S. Constitution, Professor Leshy.

Leshy fails to observe that the 1872 Mining Law is the purest remaining example of self-initiation and "free enterprise" in the U.S. today.

The process of mineral exploration under the 1872 Mining Law has effectively identified and "inventoried" critical and strategic minerals, rare earths, etc., in the vast Western U.S. The Soviet Union has roughly *three times* the undeveloped mineral areas of the U.S.; and, God forbid that the Soviets were to ever adopt such an effective "incentive system" of mineral exploration as our 1872 Mining Law. If the Soviets were to effectively explore and develop their vast mineral reserves, they would "bury" us economically, much as the Japanese have done what they were unable to do militarily—that is, literally, bury us with their production of steel, T.V.s and automobiles.

Just last summer one of the largest talc mines in the U.S. closed down completely and moved all of its plant and technology to Mainland China to mine and process talc there, and to sell talc to the U.S. at the increased process prices—directly resulting in further millions of dollars of increase in the U.S. trade deficit, because the U.S. will no longer export talc, and will now import expensive processed talc from China at premium prices.

The Mining Law and the U.S. Constitution have both survived well over 100 years, with only minimal amendments; and both are vibrant and working well today. If it is not broken, don't fix it. Our government should not jump into premature action on legislation. In 1890 critics of the U.S. Patent Office suggested that it be closed down because everything had already been invented. Leshy's labeling of the Mining Law as "outdated" is false. The Mining Law is no more outdated than its basis—free enterprise and individual self-initiative.

Leshy's book is an intellectually dishonest effort to influence legislation to conform to the personal environmentalist views of Leshy and his associates. The book is a direct appeal to the majority of U.S. citizens and legislators who are essentially uninformed about the great American free enterprise operation of the 1872 Mining Law. Leshy did not write this book as a scholarly treatise, but, rather, as an insidious, unfair and misleading lobbying tool. The environmental groups who "commissioned" Leshy's book have printed and distributed hundreds of copies to our U.S. Congressmen and Senators under the guise of being an "erudite and balanced treatise".

When and if you read Leshy's book, please remember to also read the 10th Amendment, the U.S. trade balance figures and U.S. history. At the risk of being repititious, I shall conclude with a one word summary of Leshy's "Mining Law" book: Insidious! □

Gold fever lured thousands to mountains

Wednesday - May 24, 1989 - THE LEADER -

By DON FIFE

The following is the first in a two-part feature by Holcomb Valley geologist and miner Don Fife who highlights 129 years of gold mining history in the San Bernardino Mountains.

HOLCOMB VALLEY — It was 129 years ago that William F. Holcomb struck gold on May 4, 1860 while hunting in the valley that would later bear his name. Within weeks hundreds of prospectors were pouring over Holcomb Valley and adjoining Bear and Lone Valleys. The towns of Bellview, Union Flat, Clapboard and Doble went from boom to bust during the next 60 years.

Holcomb Valley had more than 2,000 miners competing for the yellow metal during the peak of the rush in the 1860-1870's. Shoot-outs and hangings were common. The Confederate miner frequently faced off against the Union miner. This was no small matter as later historians concede gold from California tipped the financial balance in favor of the Union Arms over the South. During the Civil War gold from Holcomb Valley brought $60 an ounce in San Bernardino, three times the official $20.67 per ounce rate.

But the odds of striking a substantial paying mine were somewhere around one in 10,000.

At first the only law was through the miners own organization. The Mining District made the rules on the size of the claim, usually between five and 20 acres, the amount of work that was required to hold the claim, and acted as a clearing house by recording and verifying who was the first to stake his claim. The Mining District rules were codified under the May 10, 1872 mining law.

Prior to the arrival of Americans in California, the King of Spain, or later the Mexican State, owned all the mineral rights. The law devised by American miners said that an individual could own the fruits of his discovery and labors. This was a revolutionary idea in the mid-1800's. It was a dramatic validation of individual freedom under the American free enterprise system. The pioneer prospectors, and miners like Bill Holcomb, created a system of mining development that is well suited to the rugged American individualist.

Although the mining law has been modified many times, it is one of the most ingenius pieces of public policy ever formulated in the U.S. It has accomodated a series of booms and busts and continues to do so. It has accomodated pervasive environmental regulation and modern land use planning. It serves American society today by supplying a substantial portion of the 40,000 pounds of mineral products each of us needs per year to sustain our standard of living.

In 1860 John Cushenbury founded "Cushenbury City" near Cushenbury Springs and Canyon on the north side of the San Bernardino Mountains. His silver strike was in base-ore and not economic at the time. Later that same year John was back prospecting in Holcomb Valley and was just in time to get wounded during a shoot-out in a local saloon.

By the early 1860's every major canyon on the north slope had a well-worn trail up from Lucerne Valley to the "gold fields" of Holcomb Valley. The most utilized were Grapevine Canyon, Silver Creek, Crystal Creek, and Cushenbury Canyons. The gold rush sparked by Bill Holcomb's discovery created demand for food, mining equipment and supplies.

The torturous burro trail up Santa Ana Canyon from San Bernardino was soon supplanted in 1861 by Jed Van Dusen's wagon road up from the northwest via Cajon Pass and Apple Valley. In 1863 John Greg Nichols, first police Judge and former Los Angeles Mayor, improved the narrow trail up Cushenbury Canyon into a wagon road to accomodate freight wagons to Duff Weaver's spectacular silver discovery at the Moronga Mine in Lone Valley. The road was soon extended by miners to the east end of Bear Valley at Baldwin Lake.

The lure of gold brought many smaller booms to Holcomb Valley through the first decades of the 19th century. According to the late Fred Thomalson, former mill-foreman at the Rose Mine in the neighboring Lone Valley Mining District, they struck an ore-shoot with 17,000 ounces (about $7 million, at today's prices) around the turn of the century. Fred's Mohawk Mine in the Holcomb Valley District produced substantial lead, zinc and silver during WWII.

Algernon Delmar, a famous British Mining Engineer from Cornwall who came to Holcomb Valley in the 1880's to work family placer holdings, found too little water in the Valley to work the gravels economically. Thus he acquired the rights to the gold discoveries of Victorville prospectors Leach and Cook on Blackhawk Mountain, east of Cushenbury Canyon.

During the next several decades more than 10,000 ounces ($4 million) of gold were mined. Cook and Leach's claims may have been one of the most significant gold discoveries in Southern California. While in the past, only the narrow, irregular high-grade ore shoots were economic to mine, their discovery is now known to contain many thousands of tons of low-grade ore that is apparently economic at today's prices.

Next week: The limestone rush

Holcomb Valley
Mining District

P.O. Box 46
Fawnskin, CA 92333

Photo 6. Algeron P. Del Mar circa 1900. He was an internationally known British Mining Engineer. First he evaluated the family and other British investors interested in the Holcomb Valley gold placers before becoming involved with the development and operation of the Blackhawk Mountain gold properties during the 1890's.

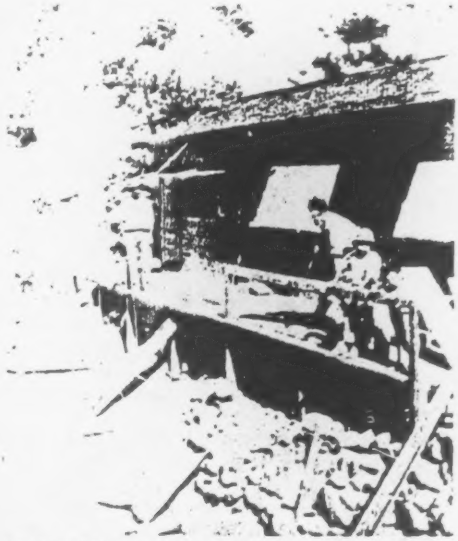


Photo 7. Bunkhouse near mill in Blackhawk Canyon circa 1925.

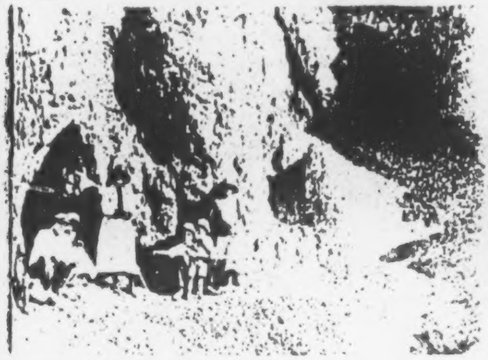
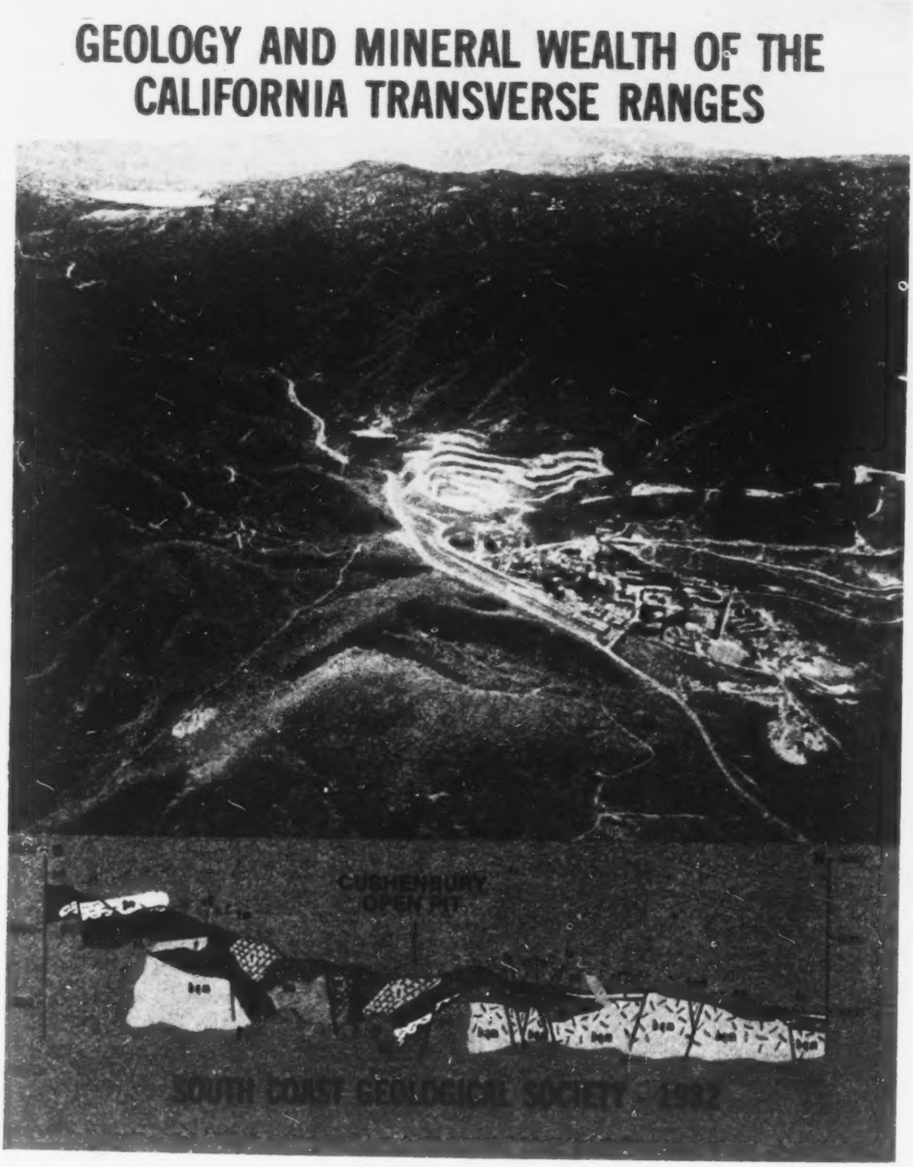


Photo 8. Del Mar family(?) outing to the mine circa 1925. Note "crushed" nature of thrust zone "vein" where extensive underground mining has revealed gold bearing ore shoots or "sheets" controlled by faulting.

Photo 9. Algernon P. Del Mar inspecting the mining camp in Blackhawk Canyon circa 1925. All photos on this page are courtesy of David Del Mar, great-grandson of Algernon P. Del Mar.



GEOLOGY AND MINERAL WEALTH OF THE
CALIFORNIA TRANSVERSE RANGES

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GEOLOGY AND MINERAL WEALTH OF THE CALIFORNIA TRANSVERSE RANGES

Edited by
Donald L. Fife and John A. Minch
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ABOUT THE VOLUME

The purpose of this volume is to document and disseminate new information on the geology and mineral resources of the California Transverse Ranges. These Ranges extend across California from Point Arguello and San Miguel Island eastward some 300 miles to the Eagle and Chuckawalla Mountains near the Colorado River. They cover an area roughly equivalent in size to Massachusetts and New Jersey combined. This province consists of a series of long, narrow, east-trending mountain ranges and valleys that are transverse to the northwest-trending Coast Ranges to the north and the Peninsular Ranges to the south. The northwest-trending San Andreas fault makes "a great bend" as it passes through the province. Rock units from nearly all eras and periods are represented, beginning with Precambrian rocks over two billion years old.

This region is an important repository of mineral wealth. Deposits within the Transverse Ranges have contributed major amounts of iron ore, diatomite, carbonate rock, clay, shale, crushed rock and hydrocarbons to the market place. In past years, chromium, mercury, gold, silver, lead, zinc, copper, tin, tungsten and borate minerals were produced. To this diversity can be added large undeveloped resources of phosphate rock with accessory uranium and great amounts of titanium and aluminum which occur in the San Gabriel anorthosite complex. Such deposits could contribute to the supply of mineral resources with improved technology. The resources in the Transverse Ranges are vital to the industrial economy of California.

This 700-page volume is dedicated to Mason Lowell Hill, an outstanding structural and economic geologist whose research in the Transverse Ranges has led to worldwide advances in structural and exploration geology.

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U.S.BORAX

The Honorable Jeff Bingaman
Chairman
Subcommittee on Mineral Resources Development and Production
Committee on Energy and Natural Resources
U. S. Senate
Washington, D. C. 20510

June 5, 1989

In Re: PROPOSED DRAFT ON MINING LAW OF 1989

Dear Senator Bingaman:

U.S. BORAX respectfully submits the following comments on the proposed draft Mining Law of 1989 and the importance of retaining the basic rights and incentives offered by the Mining Law of 1872.

The proposed Mining Law of 1989 draft was reviewed and found to be a flawed and inadequate attempt to draft a new Mining Law. The bill was obviously drafted by parties who do not understand the Mining Law or the property rights of a valid mining claim.

Any new Mining Law should provide the incentives that exist in the present law and that are so necessary to such high-risk ventures as mineral exploration. More importantly, any new Mining Law must honor valid and existing property rights.

Our primary concerns with the concept of the proposed Bill is it is a very cursory attempt to address a very complex issue (the replacement of a 117 year old Act that has been clarified and defined by Interior Department regulations, Interior Board of Land appeal decisions, court decisions and subsequent acts). We call your particular attention to Titles II and V:

> Title II is flawed in that it does not provide assurance in the granting of the "exploration plan" that the locator will have the right to develop and operate the valuable minerals found.
>
> Title V is flawed in that it abrogates rights to valid and existing claims and constitutes a taking.

U.S. BORAX is a mineral resource company with over 100 years of experience with the Mining Law of 1872. Our predecessor, Pacific Coast Borax Company, pioneered the exploration for and development of borax minerals in the United States. We have been the leading supplier of borates in the world for most of these 100 years and have contributed greatly to the economic well-being of the United States.

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MAIL ADDRESS: P.O. BOX 75128, SANFORD STATION, LOS ANGELES, CA 90078-0128

Our company was built on the incentive and property rights offered and assured by the Mining Law of 1872. Like the Homestead Law of 1862 which promoted the agriculture base of the nation, the Mining Law was designed to promote the development of the nation's mineral resources. In both cases the incentive was ownership of the land developed.

The Mining Law of 1872 states that all valuable mineral deposits in lands belonging to the United States are free and open to exploration and purchase and the lands in which they are found, to occupation and purchase.

In summary, the law allows these valuable minerals and the lands in which they are found to be acquired by the location of mining claims. Mining claims provide a possessory interest in the land within the claim boundaries and the law grants the right to hold the claims under possessory ownership or to proceed to patent.

The Government Accounting Office Report, dated March 1989, on the Mining Law of 1872 makes it necessary to emphasize the fact that the acquisition of land by the location of mining claims requires that the locator locate and hold a valid claim. It is also important to clarify that in order to establish a valid claim that will withstand a challenge by the federal government, the claimant must prove the claim contains a mineral deposit that will support future commercial development and operation.

Despite the statements and implications contained in the above referred to GAO Report, patenting a mining claim includes many requirements of which the paramount requirement is proof that the claim contains a mineral deposit that can be mined and disposed of at a profit.

The Mining Law of 1872 has been subjected to criticism as a "give-away", as being environmentally undesirable and being out of date. Such criticism fails to recognize certain important facts.

As for the Mining Law of 1872 being a "massive give-away" of public lands, this is hardly the case. The total acreage covered by mineral patents issued between 1872 and 1988 is 0.14% of the total acreage of the United States.

As stated above, establishing a property right under the Mining Law is very expensive. It requires that the minerals discovered are valuable. However, valuable mineral deposits are not just found - the indications are found but a deposit of value must be developed. It must be developed by a sampling program that determines the shape, size and quality of the ore deposit; that is, drill holes, excavations, assays, etc. Such development must show mineral or minerals of a grade and quantity that will allow the mining, separation and sale of the mineral or minerals at a profit.

In the case of the large, low-grade disseminated mineral deposits that are usually found today, the "proving up" of a discovery of valuable mineral on each claim requires an extensive and expensive exploration drilling program.

For example, U.S. BORAX expended over $13 million in the exploration of its Quartz Hill molybdenum deposit in Southeast Alaska, which is equivalent to $186,000 per claim or $9,300 per acre. To-date more than $100 million have been invested in the exploration and development of the deposit, and we are only in the final stages of the Environmental Impact Statement and permitting. About 20% of the costs to date have been for environmental data collection, studies and information required for the EIS and permits.

The cost to date, therefore, is $1.4 million per claim or $70,000/acre. The cost of putting the project into operation is an estimated additional $800 million. Although the Quartz Hill project is not a normal or average size project, it does demonstrate that the cost of acquisition of mining claims is expensive and not a "give-away". Of equal importance is the fact that investments in mineral exploration and development are very high risk ventures.

The environmental impacts of present day mineral exploration are usually undetectable to insignificant. Regional mineral reconnaisance studies and surveys usually require little, if any, disturbance of the land surface. When target areas are located, drilling is usually required; however, today's drilling methods and helicopter access, when necessary, cause little environmental impact (Reference, U.S. BORAX'S exploration and development drilling on its Rock Lake claims adjacent to and within the Cabinet Wilderness Area, Kootenai National Forest).

It is only when minerals of a quantity and value that justifies development are found that land use impacts occur. However, such areas of impacts are usually small (a few square miles). We submit that such impacts are justified by the mineral resources produced and the ability of most mined areas to be reclaimed.

The U. S. Department of Interior Report entitled "Final Report of the Task Force on the Availability of Federally owned Mineral Lands" issued in 1977 reports that the total land area affected by all mining in this country is less than 0.3%. Between 1930 and 1971 only 3,650 acres (0.16%) of the total land area has been reclaimed. We believe it is safe to suggest that this percentage is higher today and will continue to improve. Today's mineral operations are carried out under plans of operation and permits that require the reclamation of the lands impacted during and/or after the operations cease.

The statement that the Mining Law of 1872 is out of date is just not true. This law has been so changed by subsequent statutes, regulations, and judicial and administrative decisions as to bear but slight resemblance to its ancestor. The law has changed as the times have changed. The tests of discovery, for example, have become so stringent that obtaining a patent today bears little resemblance to even 25 years ago -- let alone 100 years ago. In short, the Mining Law of 1872 appears to be a perfect example of the best of the American legal system, that is, the ability to adapt to the needs of the times without becoming unworkable.

Enacted by Congress over a century ago, the Mining Law of 1872 continues to serve the nation exceedingly well in the nurturing of a productive mining industry. In attempting to correct any deficiencies that have arisen because of changing times, care must be taken to preserve its dynamic elements. New is not necessarily good -- nor is old. What is good is what serves the nation best. In point of fact, the present-day need for minerals, and the difficulties, costs and capital risks in finding and developing them, makes the incentives of the law more necessary today than in 1872.

The Public Land Law Review Commission created by Congress spent millions of dollars in the most comprehensive review of our public land laws ever conducted and had the perfect opportunity to recommend ending a law allegedly so abusive of the public interest. As a matter of fact, with some revisions to further update the law to current times, the Commission recommended retaining the Mining Law of 1872. We believe the work of this Commission should be given careful consideration; it is the only recent objective analysis of our public land policies.

In the past, those who suggest the nation place locatable minerals under a leasing system propose to take away or greatly damage the elements that are necessary to encourage private expenditures in mineral exploration and development:

* A secure right to access
* A secure right of tenure
* A profit

All proposed locatable mineral leasing acts which we have reviewed are so full of discretionary language on the part of the federal government as to offer little, if any, security to the prospector. Thus, under such proposed law, the prospector loses the incentive to prospect and the nation loses a privately financed source of mineral resources.

Based on the importance of domestic sources of minerals to the economy and security of the nation, we recommend the retention of the basic rights offered by the Mining Law of 1872.

Sincerely,

Eugene D Smith

Eugene D. Smith
Vice President
Government & Public Affairs

EDS/sb

CC: All Subcommittee Members
Representative Don Young
Ian White-Thomson
R. C. Munro
J. M. Colvin
Jack Ferguson
Keith Knoblock, AMC
Glenn Rouse, CMA

June 21, 1989

The Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral Resources,
Development and Production
Committee on Energy and Natural Resources
SD 362 Dirksen Senate Office Building
Washington, DC 20510

RE: Draft Bill to Provide for the Disposition of Hardrock Minerals on Federal Lands - "Mining Law of 1989"

Dear Senator Bingaman:

I wish to go on record expressing my disapproval of S.1126, Senator Bumpers "Mining Law of 1989".

This is an ill-conceived bill as it will cause great damage to the U.S. Mining industry by reducing its ability to compete with foreign interests. The principal facts leading to this conclusion are that the operating costs of the mining industry will greatly increase and its flexibility in exploration will therefore decrease.

I urge you to kill the bill as it stands, because if successful, Senator Bumpers will do a great disservice to our nation.

Thank you.

Yours truly,

Michael Fiannaca

THE WILDERNESS SOCIETY

STATEMENT OF DR. W. THOMAS GOEROLD, CHIEF ECONOMIST FOR ENERGY AND MINERAL RESOURCES FOR THE WILDERNESS SOCIETY, SUBMITTED FOR THE HEARING RECORD OF THE SUBCOMMITTEE ON MINERAL RESOURCES, DEVELOPMENT AND PRODUCTION OF THE COMMITTEE ON ENERGY AND NATURAL RESOURCES, CONCERNING THE PROPOSED MINING LAW OF 1989, JUNE 7, 1989.

Mr. Chairman and Members of the Committee, I am W. Thomas Goerold, Chief Economist for Energy and Mineral Resources for The Wilderness Society. With more than 300,000 members nationwide, The Wilderness Society is dedicated to conservation and enlightened stewardship of our public lands. I appreciate this opportunity to discuss an issue which is a primary concern of our organization -- hardrock mining on federal lands. This testimony addresses many of the ongoing concerns that The Wilderness Society has when dealing with the antiquated Mining Law of 1872. I would like to state The Wilderness Society's position on these issues and to make several proposals for replacing the current mining law with legislation that better serves this nation's interests.

The Wilderness Society commends Senator Bumpers for addressing the blatant inequities and poor public policy embodied in the Mining Law of 1872. This law continues to have one of the most negative impacts on the public lands of any current law. The Mining Law was enacted 117 years ago during an era when federal government's policy encouraged settlement of the western United States without regard to the consequences. The 1872 legislation gave away all federal rights to minerals on public lands and allowed purchase of surface rights for $2.50 or $5.00 an acre. As a result of the current Mining Law the federal government now has very little control over mineral operations on most federal lands. With today's emphasis on budget-balancing and in view of the public's increased concerns about the quality of our environment, the 1872 law is an anachronism.

Hardrock Mining in the United States

The U.S. hardrock mining industry has undergone substantial change over the past two decades. Especially in the last ten years, the value of mineral production and the number of

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domestic employees extracting metallic minerals (the vast majority of hardrock minerals are metals) has decreased substantially. In 1970, the metal mining industry contributed approximately $4.5 billion (inflation-adjusted 1989 dollars) to the U.S. Gross National Product (GNP). This value represented about 0.15 percent of the total 1970 GNP. By 1985, the share of GNP claimed by the metallic mining sector amounted to just $2.6 billion (1989 dollars), a decrease of 42 percent from 1970, and representing only 0.06 percent of 1985 GNP.

Coincident with this decrease, the number of workers employed in the industry declined by an even larger proportion. In 1970, the metallic mineral sector employed 83,000 people. Employment decreased 46 percent by 1985, to approximately 45,000 workers. Workers in the metal mining industries comprised about 0.05 percent of total national employment in 1985.

The message from these statistics is that the domestic hardrock mining industry is not the economic force that it once was in developing the West. While year-to-year fluctuations in metal prices may cause some temporary spikes in output or employment, metal mining is a classic example of a boom and bust industry. A large number of the ghost towns scattered throughout the West are a testament to the lack of strength and durability of an economy based on minerals extraction.

A healthy environment and unspoiled natural lands are also a part of our national wealth. People are lured to the West by the prevalence of wild and scenic lands that do not exist elsewhere. Tourism and other service sector industries continue to show a strong and sustained growth, directly opposite to the trends shown in the hardrock mineral industry.

Despite the decline of the hardrock mining industry, domestic metal production is still important to the nation. The metals supplied by domestic mines are utilized in many other manufacturing industries throughout the country. However, new legislation should ensure a fair return to the national treasury for use of resources on public lands, consistent with sound environmental practices.

The Wilderness Society's Recommendations

Definitions. One of the more nebulous aspects of the Mining Law of 1872 is that it applies to a class of materials that is not explicitly defined. While the law allows location of hardrock minerals, the list of materials treated as locatable minerals are only those materials not included in other acts. The Mineral Leasing Bill of 1920 excluded oil, natural gas, coal, oil shale, phosphate, sulfur, and other materials from location. Later legislation also removed the so-called common varieties of minerals--such as sand and gravel, stone, and clay--from location. Yet, uncertainty still exists over which minerals are considered locatable and thus subject to the mining law. The Wilderness Society recommends that new legislation explicitly define and list minerals or elements that are to be governed. Common practice dictates that the majority of materials covered by the 1872 act are metallic elements (e.g. gold, silver, copper, lead, zinc, etc). New legislation should list these elements and stipulate that any elements not explicitly covered by new or existing laws should be subject to leasing at the discretion of the federal government.

Federal Lands Eligible for Mining. The implicit assumption in the Mining Law of 1872 is that mining constitutes the highest and best use on federal lands, creating a major problem in that the federal government cannot deny hardrock mining on federal lands open to location unless it causes "unnecessary or undue degradation" (as defined in the Federal Land and Policy Management Act of 1976). The Wilderness Society believes Congress should recognize the significant natural, cultural, and environmental values of the public lands and the fact that these values may outweigh the benefits accruing from mining. New mining legislation should provide for the Secretary of the Interior or the Secretary of Agriculture to deny mining on federal lands on a case-by-case basis if such activity would compromise significant natural or cultural values of the land or environment.

In a related concern, Congress should take timely action to change the status of lands proposed for wilderness designation. There are currently many areas, especially in Oregon and Nevada, where federal lands are proposed for wilderness status. These lands are now open to mineral location and therefore subject to degradation of wilderness values. We recommend that the federal lands nominated for wilderness designation be closed to new mineral location until their final status is determined.

Exploration Claims, Diligence, and Patenting. The proposed legislation introduced by Senator Bumpers preserves much of the claimstaking procedure originally outlined in the 1872 Mining Law. Mineral claims should be doubled to 40 acres, with a one-time recording fee of $100. To address one of the major shortcomings of the 1872 law, new legislation should not allow claimholders to keep their claims indefinitely simply by proving $100 worth of labor annually per claim. This provision has led to significant environmental damage as claimholders indiscriminately bulldoze trenches, build unnecessary roads and structures, and undertake other destructive actions in order to satisfy the labor requirement.

Government approval of an exploration plan that involves more than minimal surface disturbance is also an important aspect of any new mining law. Significant degradation of federal lands including road building, trenching, drilling, and other activities has occurred in the past during the minerals exploration phase. Approval and monitoring of an exploration plan should give the government some control that is currently lacking over mineral activities on federal lands.

New legislation should recognize the need for diligence on the part of the claimholders. The federal government should require an annual payment of $1000 per claim with no labor requirement. The proposed annual claim rental fee of $1000 would raise significant revenue even if paid on only a fraction of the 1.2 million active claims. For example, if only 10 percent of the claimholders pay the annual $1000 fee, $120 million would be collected.

The Wilderness Society agrees with Senator Bumper's proposal that a mineral patent should be applied for within 10 years of the staking of the claim or the mineral rights revert to the federal government. The patent should transfer only the mineral rights to the claimant until the mineral deposit is exhausted or production is halted. All surface rights should be retained by the government. The surface rights can be leased to the mineral developer at a fair market value. After granting the patent the mineral developer should forfeit the mineral rights if significant quantities of ore are not produced during any five year period. These requirements should force diligence on the part of the claimholders. Also, these provisions should allow the government to regain control over many of the 1.2 million active claims not containing economic quantities of minerals. A large added benefit of this proposed legislation is the avoidance of damage to the land and environment that is obtained by dropping the labor requirement.

An acceptable alternative to 10 year maximum period before mineral patenting is to allow for a series of progressively escalating payments to the treasury. This action would allow a potential mineral developer with a sincere interest in the mineral values of a claim to continue exploration.

Royalty Payments and Treasury Receipts. Because the 1872 law does not require developers to pay royalties to the government for the extraction of publicly owned minerals, taxpayers in effect are subsidizing mineral operations on public lands. In 1986, approximately $7.9 billion of hardrock minerals was produced in the United States. Although the government keeps no statistics on the production of minerals from federal lands, the majority of the mineral output was probably obtained from Forest Service or Bureau of Land Management lands in the West. If even $5 billion of the 1986 total was produced from federal lands, a royalty of 12.5 percent of the gross value of the minerals would have contributed as much as $625 million. This 12.5 percent royalty is similar to the levy charged to developers of offshore oil and gas and the 12 percent gross royalty taken from surface coal mining operations on federal land.

The monies collected under this law should be split between the federal government and the state in which mineral production occurs. A portion of the revenue retained by the federal government should be earmarked for cleaning up the extensive abandoned hardrock mines throughout the western U.S.

Environmental Protection. New legislation should recognize the importance of environmental safeguards where mining is taking place. The federal government should obtain bonding in an amount sufficient for complete and timely reclamation of the land, before any mining operations begin. In addition, the Secretary of the Interior or Agriculture should institute procedures that make a full evaluation of the potential impacts of current and potential future mining activities before approving any mining plans on federal lands. The Wilderness Society agrees with Senator Bumper's assertion that reclaimed mining lands should support the same uses to the same extent as before mining occurred.

No mineral patents or mining plans should be issued to any firm or individual that has failed to comply with reclamation requirements established under this legislation or any other natural resource acts. This condition would assist in limiting multiple violations of the mining law.

Conclusion

The current mining law is a continuing source of dismay to those who are concerned about our public lands. Mining firms may assert that the law has served America well for 117 years. But, a look at the structure and incentives presented in the 1872 Mining Law shows that it gives away valuable mineral rights owned by taxpayers and does not allow the federal government necessary controls on the mineral activities on federal lands. New legislation is critically needed to stop this subsidized destruction of our public lands.

Testimony on the proposed changes to the Mining Law of 1872

Before the

Subcommittee on Mineral Resources,
Development and Production

Committee on Energy and Natural Resources

by Bruce Ennis

June 6, 1989

Mr. Chairman,

I am one of the owners of a Billings, Montana company called ECM, Inc. ECM's business is to prospect for and assemble metals exploration targets in the western states. Most of our targets include unpatented mining claims located on federal land.

I first saw a copy of the bill yesterday and was informed that written testimony must be submitted today. Thus, this testimony is hurried and probably incomplete.

It is important that this Committee understand that the bill does not revise, tune-up or modernize the Mining Law of 1872; it completely supercedes the 1872 legislation and replaces it with a leasing system. Anybody who says otherwise is trying to fool the Committee.

Given that the present bill replaces the 1872 Act, the Committee should ask whether the 1872 Act was bad public policy when enacted, or has become bad public policy since. It is clear to me that the 1872 Act was one of the most successful pieces of legislation in the history of our country. It provided the foundation for development of the metals mining industry in the western states; an industry which is fundamental to the economic welfare of our country.

The second question is whether the 1872 Act has become such bad public policy that it should now be sacked. Let me approach this question from the perspective of our business.

The economic provisions of the bill suggest that its author believes that those of us who operate on the public lands under the 1872 Act are some how taking advantage of the federal government as a part of a private get-rich-quick scheme. An examination of ECM's business will convince anyone that that is not the case.

Ours is a well-financed, well-run business staffed by experienced businessmen and four exploration geologists who, between them, hold three master degrees and one Ph.D, and have more than 50 years of metals exploration experience. We can all testify that there is no easy money. We work long hours at low pay (even by congressional standards), on the hope that we may at one time be involved in a discovery and share in the product of an operating mine.

Our group tries to assemble 10-20 exploration targets per year. In order to accomplish this in 1988, we had to do preliminary research on approximately 1000 ideas and work in the field (inspection, mapping and sampling) on about 300 of these.

The bill will put us out of business, as it will most others who work in early stage exploration (prospecting) like we do. Maybe the mining industry and the economy can do without us, and maybe we can return to the business if there is a substantial increase in metals prices, say, $3 per pound copper, $10 molybdenum, $800 per ounce gold, or $1,000 platinum. In the meantime, however, we will have to find other work.

If the bill is enacted, what will probably happen is that the smaller companies will disappear. There will be widespread consolidation within the industry until it consists of 5 to 10 large integrated mining companies which are supported by the cash flow from the several most profitable domestic mines. The industry will certainly look much different than it does now, and act different as well.

A better title for the bill might be the "Mining Industry Consolidation Act of 1989."

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RoyalGold,Inc

June 21, 1989

The Honorable Jeff Bingaman
Chairman
Subcommittee on Mineral Resources
Development and Production
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Senator Bingaman:

These comments are being submitted for inclusion in the record of the hearing that your subcommittee held on the Mining Law and on S.1126. They are submitted on behalf of Royal Gold, Inc., a Denver, Colorado-based gold exploration and production company that operates in Colorado, Arizona, Nevada, California and Wyoming.

Royal Gold is one of the new gold producers that entered the business in the mid-1980's. We produced our first gold in early 1987, and have produced 25,800 ounces of gold from start up until now. In the process we have created 125 direct mining jobs, and have supported probably three times that number of related jobs. All but one of our nine mining locations involve unpatented mining claims staked by us or our predecessors in interest.

I have read the reports of the hearing and most of the statement submitted for the record. I agree with Mr. Delcour's statement and particularly call your attention to Mr. Alfer's excellent statement in support of retention of the current law, and rejecting the S.1126 as a retrograde step that ignores the worldwide trend toward more, not less private initiative, and toward more efficiency in the delivery of governmental policy and service, not less.

I am writing to particularly stress two points which we feel are of critical concern in the debate over whether to adopt changes in the mining law. Both relate to fear that a change in the law will mire the industry in a period of uncertainty and delay while the land managing agencies try to establish regulations under a new law, and while the courts sort out the many ambiguities that will necessarily arise out of such a new law.

The current law is predictable. We can look to a massive body of case law for guidance on almost any matter that might come up under the mining law. Dozens of U.S. Supreme Court and hundreds of lower Federal and State Court and administrative agency decisions provide clear answers to our questions. And parties are able to sort out most disputes in private legal actions that do not burden the land managing agencies or the courts.

We are particularly concerned about the provisions of S.1126 that relate to changeover from the current system to the new claim regime. It appears to us that our existing properties will be heavily burdened by being forced into the new system, and that we may expect that the titles to our unpatented mining claims may be rendered uncertain for years to come. When we look to the time and litigation that was required to do something as simple as recordation of mining claims under FLPMA, which took years and even required a U.S. Supreme Court review of the meaning of a filing date deadline in the statute, we are horrified at the prospect of having our projects tied up for years while agencies try to promulgate rules, and litigate every factor of the new law.

Most of Royal Gold's projects involve unpatented mining claims. We have been successful in producing gold from some such claims, and have made a significant gold discovery on lands in Nevada where major companies had overlooked opportunities. We do not have the financial muscle to wait while a new law is sorted out, and we fear that without better changeover provisions in the statute, we would be unfairly pushed off the public lands and our projects would be rendered uneconomic.

We strongly urge that the current law be left in place. However, we request that if the sponsors of S.1126 persist, they consider holding a special hearing to solicit ideas for better transition provisions in the bill. I am sure that the sponsors do not wish to shut down current mining activity on public lands or preclude participation in the industry by smaller firms, but it is my testimony that such an unintended result will surely follow if the bill is passed in its current form. There are ways in which an orderly transition could be achieved, and we urge your consideration of such approaches.

Sincerely,

Stanley

Stanley Dempsey
Chairman

/jev

CARRINGTON CONSULTANTS

Honorable Jeff Bingaman
Chairman Subcommittee on Mineral Resources
Production and Development
Committee on Energy and Natural Resources
United States Senate
Washington, D. C. 20510

89 JUN 26 AM 10:47

June 16, 1989

Senator Bingaman:

I understand your subcommittee is currently holdings hearings on a proposed law known as the "MINING LAW OF 1989". I only learned of this proposed legislation on June 15, and then only by chance. In addition to the comments which follow I would like to request that you extend the comment period on this matter so that people vitally interested and directly affected by it may submit their comments. No one with whom I have spoken has been aware that such an important piece of legislation is even being considered.

As to the comments which I would like to make, I would point out that the existing MINING LAW OF 1872 as amended and the associated body of law in place, is, while not without problems, perhaps one of the most workable and flexible bodies of law currently in force. Certainly specific cases arise where problems occur as is to be expected in any situation where an industry as diverse and varied as the United States Mining Industry is today. These problems are, and have been solved by various means including amendment, regulation and court decisions. To pass the proposed "MINING LAW OF 1989" will effectively be taking a one hundred year step backward.

At present the United States enjoys one of the strongest mining industries in the world and in contrast to many other countries does not have prop it up with subsidies of taxpayers money. If the proposed law, or anything close to it passes the U.S. will most assuredly wind up subsidizing mining with public funds just as it has found it necessary to subsidize many other basic industries in the U.S.

At present the prospect of an individual being able to go out and "strike it rich" is one of the last intact shreds of the Great American Dream. If this law is passed it will be virtually impossible for any individual or even most mining companies to prospect, explore or develop existing or new deposits leaving the U.S. Minerals Industry in the sole domain of only the largest of the International Corporations and Conglomerates.

Currently the bulk of public attention is focused on the highly visible gold industry, and fails to recognize the important contribution to the basic U.S. economy by not the gold industry but also by the many industrial, ferrous and base metal producers which operate throughout the U.S. The near term effects of this proposed legislation are staggering when one considers the effect it will have, if passed. The prices of all consumer will begin to rise as manufactures begin to raise prices to compensate for the expense of using foreign products, or those products from the few U.S. producers which may be able to maintain production. The producers of domestic industrial materials operate on one of the thinest profit margins in the mining industry, and when the specter of an 8% gross royalty is thrown in the royalty may well consist of more than 90% of the profit from the operation.

The notion of a ten year maximum life on a claim is for most part complerely impractical as only a small fraction of mines in operation to day are in operation within ten years after the date of initial claim location. When placed in conjunction with the permitting process for mines which in some cases may take over five years due to regulatory delays.

If there is to be the tremendous increase in annual work commitments there must also be some provision for allowing that work to be done with a minimal amount of bureaucratic delay or interference.

In all the proposed law will put the entire United States at at a tremendous disadvantage when it tries to compete with the world at large, and will serve to spark a round of inflation which will certainly rival that of the late 1970's.

Again I implore you to extend the comment period on this legislation to allow for comment from more than the select groups which have thus far testified.

Respectfully Yours,

Robert G. Carrington

Robert G. Carrington

California Chamber of Commerce

June 20, 1989

The Honorable Jeff Bingaman, Chairman
Senate Subcommittee on Mineral Resource
Production and Development
524 Senate Hart Office Building
Washington, D.C. 20515-3102

Dear Senator Bingaman:

The California Chamber of Commerce respectively submits this letter for the subcommittee record on S. 1126 introduced by Senator Dale Bumpers. The Chamber opposes S. 1126 which would create the Mining Law of 1989 and establish a lease system of public lands and emasculate the 1872 Mining Law.

Under the 1872 Mining Law individuals and companies are able to explore public lands in search of mineral deposits and obtain title to verified deposits. This law serves a beneficial public purpose in encouraging exploration for new mineral deposits which are necessary to sustain our modern manufacturing industries.

Under S. 1126, however, individuals and mining companies would be faced with unreasonable due diligence costs in order to explore public lands. Most individuals and many smaller mining companies who could not afford these fees and would go out of business. The bill also establishes an unreasonable royalty system and eliminates the ability to obtain title to the land. These provisions would discourage new explorations.

Mining corporations would be crippled without the aid of the individual prospectors to help in the location and identification of future mineral deposits. With the increase in fees to lease public lands and the lack of incentives to secure future mineral deposits, the price for U.S. minerals will rise and the nation would become more dependent on foreign materials.

The 1872 Mining Law has been able to survive over 100 years of mineral booms and busts, land use development projects and changes in environmental regulations. We urge that you continue to allow this law to govern the mining community and vote "No" on S. 1126.

Sincerely,

C.W.H. Solinsky
Resources Director

CWHS:chm

cc: Committee Members
Lisa Vehmas, Majority Staff
Patricia B. Kennedy, Minority Staff

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NORTHERN PLAINS RESOURCE COUNCIL

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89 [illegible] 9:29

June 14, 1989

The Honorable Jeff Bingaman, Chairman
United States Senate
Subcommittee on Mineral Resources and Production
Committee on Energy and Natural Resources
Room 364, Dirksen Building
Washington, D.C. 20510

The Honorable Dale Bumpers
United States Senate
Room 229, Dirksen Building
Washington, D.C. 20510

Dear Senator Bingaman and Senator Bumpers:

I appreciate the opportunity to enter the position of the Northern Plains Resource Council (NPRC) in support of reform of the 1872 Mining Law for the hearing record on S. 1126.

Northern Plains Resource Council is a non-profit grassroots citizen organization comprised of 1500 members and supporters throughout Montana. NPRC members have been active in mining and other natural resource and agricultural issues in Montana since our formation in 1972. Three of NPRC's affiliate groups have members directly affected by current hard rock mining activities.

The last one-hundred years have brought changes in mining technology and increased exploitation of low-grade ore deposits. The long-term impacts of these changes on the land, water, and communities in mining areas are severe and often unnecessary. Many areas of the West have been permanently scarred by past and present mining activities allowed under the 1872 Mining Law.

The severity of these mining impacts illustrates the inadequacy of the 1872 Mining Law and the need for reform. To this end, I would ask that you enter the enclosed "NPRC Positions on the 1872 Mining Law," into the hearing record. If you have any questions, or require more detail or rationale for our suggestions, please contact NPRC's Billings, Montana office: 419 Stapleton Building, Billings, Montana, (406) 248-1154.

Thank you for your time and consideration.

Sincerely,

Pat Clark

Pat Clark, Chairman
NPRC Hard Rock Task Force
McLeod, MT

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Northern Plains Resource Council positions on 1872 Mining Law

The last significant national hard rock legislation was written in 1872. Obviously, laws governing 19th century mining practices bear little relevance to modern mining methods and the problems they create. Many Northern Plains Resource Council members are directly impacted by hard rock mining. Their water, land, roads, and community services are threatened. We believe the law must be changed. The following is a brief summary of NPRC positions for 1872 Mining Law reform.

1) Agencies should be required to evaluate the suitability of public lands for mineral development, and be allowed to declare certain lands as unsuitable for mining. NPRC supports this concept of multiple use of public lands in which mining is not the pre-emptive use and other resource uses are balanced with mining.

2) Mining exploration and operation permits should contain plans to provide for reclamation of disturbed lands to comparable pre-mining utility and stability, which should include restoration to approximate original contour. These plans should include bonds of sufficient amount to ensure reclamation of all impacted resources, including protection or replacement of ground and surface waters. Public hearings should be required before reclamation bonds are released.

3) Congress should establish uniform regulatory standards to manage hard rock mineral development on public lands and consolidate the present fragmented agency authority. Regulatory agencies should also be allowed to consider the past record of applicants when determining the amount of a reclamation bond. This regulatory system should also include an applicant violator system that allows agencies to reject applications from companies with permit violations at other mines.

4) Fair monetary return to the public should be guaranteed for the extraction of publicly-owned mineral resources. Congress should establish a new fee on all hard rock mineral production to create revenues for an abandoned hard rock mine reclamation fund.

5) New provisions should require diligent development of hard rock minerals claims, similar to the diligent development requirements found in the Federal Coal Leasing Amendments Act which require minimum production levels within ten years.

6) NPRC supports provisions allowing for citizen enforcement of hard rock mining laws and regulations through an administrative appeals process and access to federal courts.

Southwest Oregon Miner's Association
Chapter Western Mining Council
710 Galice Creek Road, Merlin, Oregon 97532

89 JUN 20 AM 9:37

The Honorable Jeff Bingaman, Chairman
Subcommittee on Mineral Resources
Development and Production
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

June 16,1989

Dear Sir,

Please include my letter in the hearing record regaurding proposed revisions to the 1872 Mining Law.

I am president of the Southwest Oregon Miner's Association, a chapter of Western Mining Council, Inc. We are a group of about 100 small scale gold miners, some part time, some full time, and some recreational miners. We are all deeply concerned about the proposed changes to the 1872 Mining Law. As we read Senator Bumpers' proposal, the small miner will cease to exist because the cost of holding claims will be prohibitive. All miners, large and small, need to hold claims for future develppment. It is not economically feasible to mine a claim and then go start looking for more ground to work. The cost of holding claims would drive most operators out of the business. With little mining going on here, strategic and precious minerals would then have to be imported and that isn't what our balance of trade needs.

We found the GAO report to be grossly inaccurate in a number of areas. It gave readers the impression that mineral patents are cheap and easy to obtain. Speaking from personal experience, they are neither. Most people spend more to obtain their patent than the land is actually worth. I spent over $30,000 before obtaining patent to 50 acres in 1987 that is assessed at $28,250. But it is my piece of heaven, and I am currently mining it and supporting my family and paying my taxes. Services of attorneys, geologists, surveyors, title companies, and patent consultants are usually necessary, and the time frame to obtain a patent in our area is about 7 years on the average- many take more than 20 years. Many claims that are being worked would not meet requirements to obtain a mineral patent.

Reclaimation on BLM and Forest Service land is required now. There are 14 different agencies that moniter mining operations in our area, many requiring permits and bonding. The problems outlined in the GAO report have manufactored for the biggest part. We can't see destroying the entire national mining industry to remedy problems that no longer or never did exist. There is surely a more rational manner to handle localized problems, and we urge you to leave the 1872 Mining Laws intact.

Sincerely,

Bruce W Crawford

Bruce W. Crawford, president

National Association of Mining Districts

To The

UNITED STATES SENATE

Subcommittee on
Mineral Resource Production and Development
of the
Committee on Energy and National Resources
Honorable Jeff Bingaman, Chairman

Presented by
Robert A. Sanregret
Representative of the
NATIONAL ASSOCIATION OF MINING DISTRICTS ("NAMD")

Re: Statement in Opposition to Senate Bill 1126, "The Mining Law of 1989" (Introduced June 6, 1989; Subcommittee Hearing June 7, 1989)

Mr. Chairman Bingaman and Members of the Subcommittee:

Thank you for allowing the National Association of Mining Districts ("NAMD") to present its views strongly in opposition to S.1126 ("The Mining Law of 1989").

The NAMD is an association of Mining Districts as authorized under the enabling clause of the 1872 Mining Law (30 United States Code, sections 21 et seq.), as follows:

> "Mining District Regulation by Miners: ... The miners of each district may make regulations not in conflict with the laws of the U.S., or with the laws of the state or territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim...[markings on the ground, records, information needed on location notices], etc." 30 U.S.C., section 28.

For purposes of identifying The National Association of Mining Districts (NAMD) and its programs, a copy of the "NAMD 1988 Report on Programs and Activities" is attached to this statement.

The NAMD strongly opposes S.1126 because the only purpose of S.1126 appears to be a revenue raising measure; but, the burdensome "fee/lease system" under S.1126 effectively "nationalizes" the U.S. mineral exploration and development business. The expected revenue under S.1126 would not be produced because the mining claimants, prospectors ("explorationists") and most large and small mining companies would simply close down, and most "majors" would concentrate on their already-existing mines and mineral prospects outside of the United States, in Canada, Mexico, Australia, Africa, etc. Several direct results of S.1126 would be:

1. No Substantial Revenue. A negligible net amount of revenue and fees would be raised, for the reasons set out herein.

2. Exodus of Mining Companies Out of the U.S. The local and smaller mining and exploration companies would close down completely, and the larger international "majors" would simply transfer their efforts to their many existing projects and potential mineral-producing facilities outside the United States, in Malaysia, Mexico, Africa, Canada, and elsewhere.

3. The "Environment" Would Not Improve. Mineral exploration and prospecting today in the U.S. is subject to close scrutiny and control under a myriad of state and federal regulations, which has already driven many mineral producers out of the U.S. If S.1126 were to drive others to foreign shores for minerals, or only a few miles away into Mexico, the U.S. environment would not be improved, because of the already tight environmental controls; but, many "developing countries", including Mexico, would welcome the "Yankee Dollar" to fund substantial mineral production plants -- with minimum or no "environmental controls" -- thereby hurting the overall world environment and air quality.

4. Mineral Prices Would Increase. By literally driving the U.S. mineral producers out of the United States we would guarantee that mineral prices would be higher, and that the supplies of many critical and strategic minerals would be subservient to the whims of foreign suppliers and cartels.

The 1872 Mining Law is about the last remaining pure example of U.S. "free enterprise", based upon the self-initiation and incentive of U.S. citizens exploring for and discovering minerals on our vast public lands. The purpose of the U.S. Mining Laws was and is to encourage U.S. citizens to explore for and develop mineral deposits on the public land, which effectively identifies and inventories the available mineral resources on the U.S. public lands at no cost to the public.

The owner of a valid unpatented mining claim, having discovered a valuable mineral thereon, owns a real property interest, as the courts have consistently held, including the specific ruling by the U.S. Supreme Court in Wilbur v. U.S. ex rel. Krushnik, 280 U.S. 306 (1930), and in other cases. The exact nature of the real property interest held by the claimowner is a "fee simple estate subject to a condition subsequent," with the "condition subsequent" being the performance of the annual assessment work on the unpatented mining claim. The process of patenting a mining claim merely removes the "condition subsequent," and, upon receiving a patent, the claimowner no longer needs to perform any annual assessment work on the claim. The fee simple estate owned by the claimholder is obviously a "possessory interest", and is "subject to the paramount title of the United States" -- and so is your personal residence. The phrases "possessory interest" and "real property interest" are accurate, but do not fully explain the fee simple estate held by the owner of an unpatented mining claim. A valid mining claim is a 100% vested fee simple estate in real property, albeit subject to divestment if the claimholder fails to perform the annual assessment work which is the "condition subsequent" upon which the claimholder acquired, and holds, his conditional fee simple interest in that parcel of public land. The Supreme Court of the State of Arkansas considered and recognized the matter of the real property estate of a "fee simple on a condition subsequent" in the authoritative 1892 case on the subject entitled Winn v. State of Arkansas, 55 Arkansas Reports 360, 18 S.W. 365 (1892), wherein the court discussed the failure of the fee simple owner to perform the "condition subsequent" resulting in the owner then losing his fee simple. An interesting aspect of the unpatented mining claimholder owning a vested fee simple in real property (subject to a condition subsequent) is that any purported "change" of the condition subsequent by the government (as, *e.g.*, raising the annual assessment work requirement from $100.00 to $5,000.00), would seem to constitute a clear taking of property rights, and, therefore, compensable under the "takings clause" of the Fifth Amendment.

The present U.S. Mining Law allows mining claim locations only by "U.S. Citizen"; but, S.1126 further nationalizes mining by expressly allowing exploration and mining by government entities and municipal corporations.

Conclusion

The present system of exploration and development of minerals on U.S. public lands was well-conceived in 1872 (and prior), has been substantially amended over the years, and works well today to identify and inventory minerals on the U.S. public lands at no cost to the public sector. The proposed "Mining Law of 1989" would be a de facto nationalization of the U.S. mining industry. S.1126 would destroy the entire efficient U.S. system of orderly mineral exploration and development; S.1126 would drive most exploration and mining companies out of the U.S. or out of business; and S.1126 would result in higher mineral prices, a dirtier world environment, and the subservience of the United States to unreliable foreign sources of important minerals -- meanwhile, when the smoke has cleared, S.1126 would not raise very much, if any, net revenue for the public coffers.

Today, when many people in China and Eastern Bloc countries are fighting and dying in quest of "U.S.-style freedoms," we should not nationalize and destroy one of the premiere and efficient working examples of freedom and free enterprise in the United States. The United States does not need and cannot afford S.1126, "The Mining Law of 1989".

Thank you for allowing the National Association of Mining Districts (NAMD) to present its views strongly in opposition to "the Mining Law of 1989".

ROBERT A. SANREGRET, Director
NATIONAL ASSOCIATION OF MINING DISTRICTS
P. O. Box 1054
Tustin, CA 92681
(714) 547-8451

1988 REPORT ON THE PROGRAMS AND ACTIVITIES OF THE NATIONAL ASSOCIATION OF MINING DISTRICTS (NAMD)

TUSTIN, CALIFORNIA. NAMD Director Bob Sanregret has reported that the NAMD member Mining Districts are active and vital, and that NAMD activities are increasing, under the specific U.S. Congressional enabling legislation, the U.S. Mining Law (30 U.S.C., Section 28).

The NAMD reports that the following public service and mutual benefit programs and activities are being coordinated with the NAMD member Mining Districts, and assisted by the NAMD:

1. Organization of Mining Districts. The NAMD assists member Mining Districts in their organizational and administrative plans, paperwork, charters, by-laws, filings, etc.

2. Registration and Filing Locations and Assessment Work. The NAMD provides information and forms to assist prospectors and miners in filing required papers (Location Notices; Amendments; Assessment Work; etc.); and the NAMD assists member Mining Districts in maintaining parallel registers of mining claims and operations in their Mining Districts.

3. NAMD Historic Site Register. The NAMD will coordinate the Mining Districts' identification, photographing and registration of "NAMD Historic Sites". including historical buildings, roads, ruins, minesites, dumps, Indian artifacts, archeological sites, etc. These sites will be registered in the official "NAMD Historic Site Register", a sign will be erected, the site will be fenced or protected if appropriate, and the site will be preserved for its historical value. Our "NAMD Historic Site Register" will be shared and coordinated with County, State and National Historical Registration Programs, and with research and studies by Colleges, Universities, Historical Societies and other groups.

4. Hazard Reports. The NAMD member Districts will encourage and assist members in watching for and reporting physical and environmental hazards observed in the field. Permanent hazards (e.g., open abandoned mine pits, old cyanide dumps, etc.) will be identified, marked and reported in writing on NAMD forms to the appropriate County, State and Federal authorities (EPA; County Sheriff; BLM; USFS; etc.); and a master reference index of the known physical and environmental hazards will be maintained by the NAMD and will be available to members.

5. Firewatch. NAMD members will be educated on procedures and communication (e.g., CB, ham radio, telephone) for immediate reporting of fire hazards and fires observed in the field. Individuals will be encouraged to participate in local volunteer fire protection and fire-fighting programs.

6. Environmental Protection. The NAMD encourages and educates members to obey environmental and reclamation laws and regulations, and to take further voluntary steps to conduct their prospecting and mining activities to prevent environmental damage and to facilitate the reclamation of sites after completion of the mining or prospecting.

7. USGS Map Reports. NAMD members will report on standard "NAMD Map Report Forms" changes and discrepancies on the USGS quad maps, to assist the USGS and other agencies in their periodic map updates. "Map report" examples include: Damaged, missing or misplaced U.S. Survey Markers or other benchmarks; changed or missing landmarks, such as water towers, roads, prospect holes; geology; etc.

8. Mining District Histories. An ambitious project of the NAMD is the compilation of comprehensive written histories of the member Mining Districts and of other significant old and current "mining camps" and mines in the Western U.S. (authors and information needed).

9. Education. NAMD will conduct and coordinate educational programs and seminars by NAMD and in conjunction with other groups, concerning matters of current concern, including: Exploration and mining industry techniques; practical field geology; equipment operation and maintenance; U.S. minerals and mining; U.S. mining history; governmental forms, regulations and reports concerning mining, wilderness areas, etc.

10. Legislative Watch. NAMD will moniter pending and prospective legislation and will offer views and testimony to government agencies and legislators. The national legislative program will be run through the NAMD Legislative Office in Washington D.C.

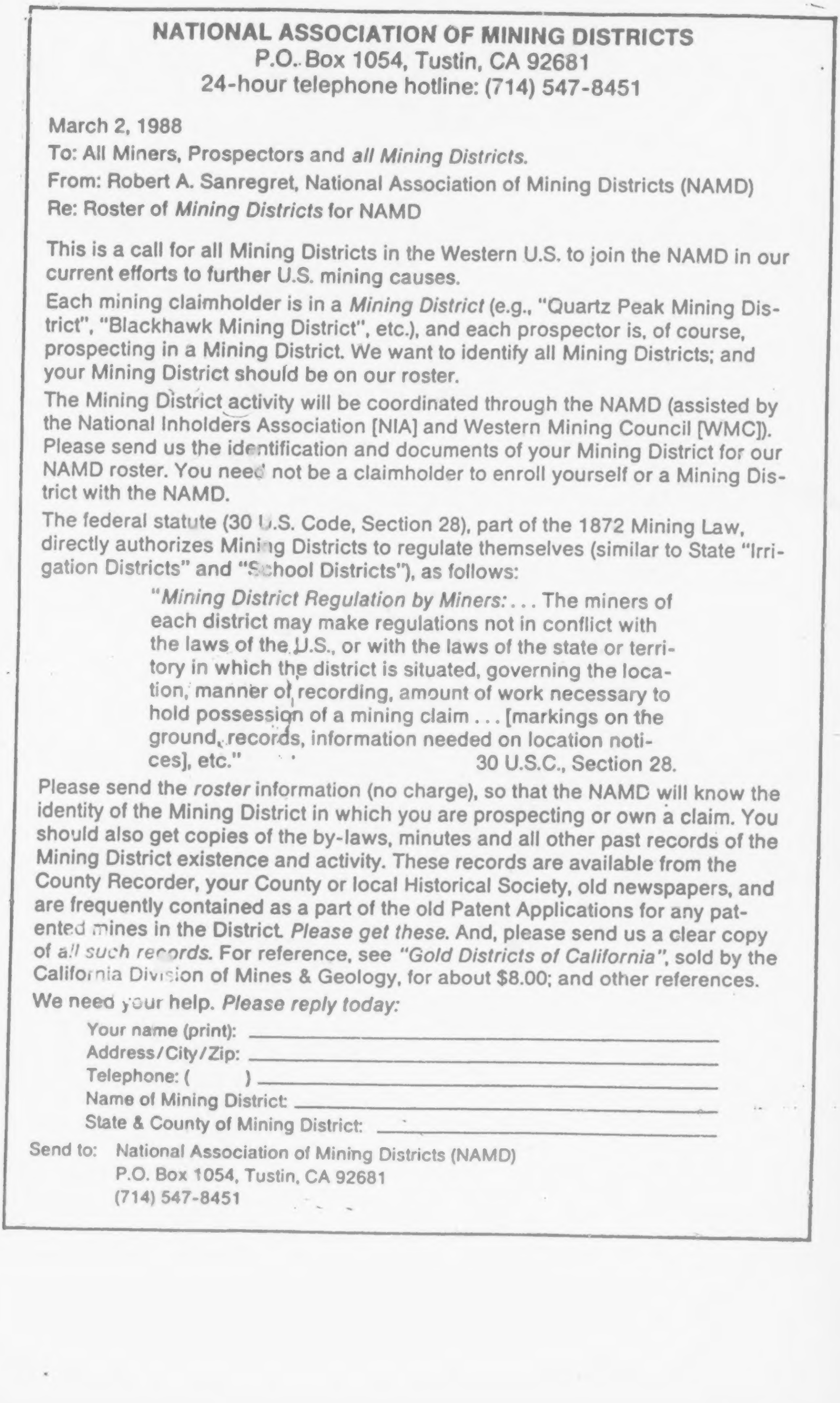
11. Ethics Code. The NAMD has a code of ethical behavior to which all Mining District members agree to comply, relative to field activities, overstaking, field courtesy, field assistance, etc.

12. Dispute Resolution. The NAMD will provide forms and facilities for the settlement, resolution or arbitration of disputes between claimholder members of the Mining Districts; and the NAMD or the Mining District will, under certain circumstances, act as an "Ombudsman" in disputes between claimholders and government agencies (e.g., BLM and USFS citations, contests, reclamation disputes, plan of operation "conditions", evictions, etc.)

13. Public Relations. The NAMD will assist member Districts to educate the public on the value and contributions to the U.S. of mineral prospectors and mining under the U.S. Mining Law.

The NAMD solicits your comments, ideas and assistance on these and other NAMD projects and activities. If you have not registered your Mining District on the NAMD Roster, send your information today (no charge) to:

The National Association of Mining Districts (NAMD)
P.O. Box 1054
Tustin, CA 92681
(714) 547-8451.



NATIONAL ASSOCIATION OF MINING DISTRICTS
P.O. Box 1054, Tustin, CA 92681
24-hour telephone hotline: (714) 547-8451

March 2, 1988

To: All Miners, Prospectors and *all Mining Districts.*

From: Robert A. Sanregret, National Association of Mining Districts (NAMD)

Re: Roster of *Mining Districts* for NAMD

This is a call for all Mining Districts in the Western U.S. to join the NAMD in our current efforts to further U.S. mining causes.

Each mining claimholder is in a *Mining District* (e.g., "Quartz Peak Mining District", "Blackhawk Mining District", etc.), and each prospector is, of course, prospecting in a Mining District. We want to identify all Mining Districts; and your Mining District should be on our roster.

The Mining District activity will be coordinated through the NAMD (assisted by the National Inholders Association [NIA] and Western Mining Council [WMC]). Please send us the identification and documents of your Mining District for our NAMD roster. You need not be a claimholder to enroll yourself or a Mining District with the NAMD.

The federal statute (30 U.S. Code, Section 28), part of the 1872 Mining Law, directly authorizes Mining Districts to regulate themselves (similar to State "Irrigation Districts" and "School Districts"), as follows:

> "*Mining District Regulation by Miners:*... The miners of each district may make regulations not in conflict with the laws of the U.S., or with the laws of the state or territory in which the district is situated, governing the location, manner of recording, amount of work necessary to hold possession of a mining claim ... [markings on the ground, records, information needed on location notices], etc." 30 U.S.C., Section 28.

Please send the *roster* information (no charge), so that the NAMD will know the identity of the Mining District in which you are prospecting or own a claim. You should also get copies of the by-laws, minutes and all other past records of the Mining District existence and activity. These records are available from the County Recorder, your County or local Historical Society, old newspapers, and are frequently contained as a part of the old Patent Applications for any patented mines in the District. *Please get these.* And, please send us a clear copy of *all such records.* For reference, see *"Gold Districts of California"*, sold by the California Division of Mines & Geology, for about $8.00; and other references.

We need your help. *Please reply today:*

Your name (print): ______________________________
Address/City/Zip: ______________________________
Telephone: (   ) ______________________________
Name of Mining District: ______________________________
State & County of Mining District: ______________________

Send to: National Association of Mining Districts (NAMD)
P.O. Box 1054, Tustin, CA 92681
(714) 547-8451

BOULDER COUNTY METAL MINING ASSOCIATION
P. O. Box 871
Boulder, Colorado 80306

June 8, 1989

Honorable James A. McClure
U. S. Senate
Washington, D.C. 20510
202-224-1006

Dear Senator McClure:

I have recently reviewed a draft of the proposed "Mining Law of 1989." The law is a potential disaster for the mining industry in the western United States. With particularity, there is no room whatsoever for individuals, small, and even medium sized companies to operate under the proposed law.

Few people not deeply involved with the negotiation and operation of mining agreements will understand the impact of the proposed 8% gross royalty in favor of the government. The role of royalties is critical to the financing of exploration, development and production operations on both public and private lands. The large government royalty would dis-incentivize the search for smaller or lower grade deposits, and make it impossible for companies without huge treasuries to explore at all -- the company that does the exploration must be prepared to take the property to production, as the property cannot be moved up the "exploration-development chain" by allocating project risk via a further royalty reservation. (Many, if not most, private leases contain either no -- or only a small or moderate -- reservation of a gross production royalty, usually called an "NSR" or Net Smelter Return.)

The increase in assessment work requirements from $100 per claim to $5,000 per claim is nothing less than ruinous. Even many small companies are exploring five, ten or twenty targets in the western states. The number of unpatented claims in these multiple targets may total hundreds, or perhaps a thousand or more, claims. The ownership of a thousand claims in, for example, 5 western states would impose an annual holding cost burden of $5,000,000. Even a highly liquid small company may have only a fraction of this amount in its treasury. Thousands of existing lease and joint venture agreements would be jeopardized, if not tossed into litigation. The United States should not adopt a "third world" type of mining law. The existing law works well, as demonstrated by America's growing pre-eminence as a major world gold producer.

The draft statute also includes a mandatory bonding requirement, presumably for the full cost of reclamation. Such bonds are unavailable at any price to small companies; cash bonding results in the immediate loss of working capital available for exploration and development. The State program in force in Colorado already works well; there is no need to impose a supervening Federal scheme of unnecessary breadth.

There are many more comments that could and shall be made. This proposed statute does not appear to have been closely examined by attorneys or others with significant operational experience.

BOULDER COUNTY METAL MINING ASSOCIATION

By
John R. Henderson, Secretary

JRH/jeg

EOMA

Eastern Oregon Mining Association, Inc.
(a nonprofit corporation)

P.O. Box 932 503-523-3285
Baker, Oregon 97814

June 5, 1989

Senator James A. McClure
Committee on Energy and Natural Resources
SD-364 Dirksen Senate Office Building
Washington, DC 20510

Dear Honorable James A. McClure:

We in the small Mining Industry are getting frustrated and very angry.

Is it Congresses intent to destroy Americas Mining Industry? Is it in the National interest to cripple or kill such a vital part of our economy? Is it Congresses intent to make America dependent on Foreign sources for our minerals?

Only the very large mines that are operating at the present time will survive Congresses intent.

Oregon alone has a $114 million revenue producing Mineral Industry. A significant part of this will be destroyed by a revision of the 1872 Mining Law.

We are afraid Congresses concern will take away from the Mining Laws that which made it work.

We can't inventory minerals like timber and other surface resources. Mining is money intensive, "The Largest Crap Shoot in the West." The mineral industry expends millions annually trying to find a deposit that may have the potential to make a mine. If they are lucky enough to find one. It still takes millions of investment capitol before they realize any profit.

The GAO report had 36 factual errors in it. Sites in the report were tailored to support their desired conclusions. Those conclusions showed a slanted, biased overview of the Minerals Industry. The GAO used half truths and unsubstantiated and out right misleading information.

The GAO report said 146 out of 240 claims located between 1948 and 1972 had no evidence of development work. Since many claims are staked and then abandoned without the miner doing any work at all, and since large blocks of claims are needed to secure large decimated mineral deposits and assessment work of $100 per claim can be done on one claim for the benefit of them all. Reclamation on surface damage done by miners looking for minerals has been in effect on the National Forest for many years where mineral exposure wasn't needed by the miner. What is surprising is that these figures show an unusually high amount of diligence.

President
Charles (Chuck) Chase

Treasurer
George Ziermann

The GAO report also concluded that $2.50 per acre land grab was underway by the Industry. They either neglected or purposely omitted that it takes approximately $4,000 per acre to get it ready for patent. That the GAO picked patented mines that would show patenting in a bad light. What they neglected to say was Land Laws had stopped them from extracting minerals. More half truths and biased reporting.

This report is so biased that congress should disregard it's contents and should launch an investigation into the reason for the biased GAO attack on the mineral industry. Oversight hearings into the GAO by Congress should be launched by a very concerned Congress. Could it be a conspiracy to either destroy or cripple the Mineral Industry?

We note that a three hour hearing is insufficient time to receive testimony on an issue of such major importance. You are also soliciting views on legislation to revise the Mining Laws.

We urge you to extend these hearings to include testimony from all interested parties.

Western Miners are angry, concerned and dismayed. We feel we are being passed by Congress and would like very much for Congress to at least listen to what we have to say before it pronounces the death sentence for our Industry.

Sincerely

Chuck Chase

Chuck Chase

Holcomb Valley
Mining District
P.O. Box 46
Fawnskin, CA 92333

JUNE 7, 1989

SENATOR JEFF BINGAMAN, CHAIRMAN
SUBCOMMITTEE ON MINERAL RESOURCES PRODUCTION AND DEVELOPMENT
OF THE INTERIOR COMMITTEE ON ENERGY AND NATURAL RESOURCES

ATT: LISA VEHMAS FOR THE OFFICIAL RECORD OF TESTIMONY ON S-1126

RE: STATEMENT IN OPPOSITION TO "THE MINING LAW OF 1989" SENATE BILL 1126 INTRODUCED JUNE 6, 1989.

HONORABLE SENATOR BINGAMAN AND MEMBERS OF THE SUBCOMMITTEE:

THANK YOU FOR PERMITTING THE HOLCOMB VALLEY MINING DISTRICT(HVMD) COMMENT FOR THE RECORD ITS VIEWS IN OPPOSITION TO THE PROPOSED MINING LAW AND OUR SUPPORT FOR THE EXISTING LAW WHICH IS SERVING THE U.S. ECONOMY WELL FOR LOCATEABLE MINERALS ON THE WESTERN PUBLIC AND FOREST SERVICE LANDS.

THE HVMD DATES FROM THE DISCOVERY OF GOLD BY WM. F. HOLCOMB IN MAY OF 1860, PREDATING THE 1866 AND 1872 MINING LAWS BY SEVERAL YEARS. DISTRICTS SUCH AS OURS WERE RECOGNIZED UNDER THE GENERAL MINING LAW OF MAY 10, 1872. TODAY OUR ACTIVE MEMBERS RANGE FROM INDIVIDUAL SMALL MINERS AND MOM AND POP PROSPECTING TEAMS TO LARGE MINING AND MINERAL PROCESSING COMPANIES. MOST INITIAL MINERAL DISCOVERIES ARE THROUGH THE EXPLORATION ACTIVITIES OF SMALL MINERS, WHO SPEND YEARS FREQUENTLY DOING THE RESEARCH AND INITIAL DEVELOPMENT THAT MAY LEAD TO DISCOVERY OF THAT RARE ANOMOLY OF NATURE THAT IS AN ECONOMIC MINERAL DISCOVERY. MOST EXPLORATION TAKES PLACE ON UNPATENTED MINING CLAIMS UNDER THE 1872 LAW. THESE ARE FREQUENTLY ABANDON IF A COMMERCIAL DISCOVERY IS NOT FOUND AND OTHERS MAY TRY THE SAME GROUND WITH A NEW MODEL OF ORE ACCUMULATION OR WITH NEW GEOLOGIC INFORMATION. FREQUENTLY SEVERAL ATTEMPTS (MAYBE A DOZEN OR MORE) ARE MADE BEFORE ENOUGH CAPITAL OR THE RIGHT ENGINEERING APPROACH IS SUCESSFUL IN CREATING A VALUABLE MINE.

WHILE PRECIOUS METALS ARE STILL MINED IN THE DISTRICT AND NEW DISCOVERIES ARE STILL BEING MADE, SINCE THE END OF THE KOREAN WAR HARD-ROCK INDUSTRIAL MINERALS MAKE UP THE BULK OF THE HVMD'S PRODUCTION. MINERAL PRODUCTION OF PROCESSED MINRRALS FOB PLANT EXCEED $100 MILLION DOLLARS PER YEAR, ABOUT 95% FROM PATENTED LANDS UNDER THE 1872 MINING LAW. THE COST OF PATENTING WAS RECENTLY ESTIMATED BY THE U.S. FOREST SERVICE AS ABOUT $4,000.00 PER ACRE WITHIN THE NATIONAL FOREST DURING THE 1980'S, A FAR CRY FROM THE COST OF THE FIRST PATENT IN THE DISTRICT CIRCA 1875.

THE SINGLE LARGEST GROUP OF UNPATENTED MINING CLAIM HOLDERS IN THE HVMD ARE THE 6,000 BENEFICIARIES OF THE AFL-CIO STEELWORKS HEALTH INSURANCE AND PENSION FUND, THE CUSHENBURY TRUST , WHO ALONG WITH OTHERUNPATENTED CLAIM HOLDERS WOULD BE GRAVELY IMPACTED BY IMPRUDENT

TAMPERING OR REPEAL OF THE 1872 MINING LAW AS AMENDED OVER THE YEARS.

AS RESERVES ON PATENTED DEPOSITS ARE DEPLETED, IT IS ABSOLUTELY NECESSARY TO EXPLORE, DISCOVER, AND DEVELOP RESERVES IN NEW AREAS. SOMETIMES NEW DISCOVERIES ARE MADE IN ABANDON UNPATENTED CLAIM AREAS. OCCASIONALLY SOME NEW MINERAL COMMODITY IS FOUND IN AND AREA THAT HAS BEEN MINED OR HEAVILY PROSPECTED: CHANGING TECHNOLOGY ECOMICS AND NEW GEOLOGIC KNOWLEGE CONTINUALLY CHANGE THE GRADE OR EVEN THE KIND OF MINERAL COMMODITIES THAT ARE IN DEMAND BY SOCIETY. FIFTY YEARS AGO NO ONE PREDICTED THE KINDS OR AMOUNTS OF MINERALS WE CONSUME IN AGRICULTURE, CONSTRUCTION, MANUFACTURING, OR NATIONAL DEFENSE. IT IS DOUBTFUL THAT ANYONE KNOWS WHAT WILL BE IN DEMAND BY OUR SOCIETY FIFTY YEARS FROM TODAY. BECAUSE OF THE DISCRETIONARY CLAUSES OR AUTHORITY CONTAINED IN THE PROPOSED MINING OF 1989, GOVERNMENT BUREAUCRACY WILL TEND TO STIFLE DISCOVERY OFNEW TYPES OF OREBODIES OR NEW CLASSES OF ECONOMIC MINERALS BECAUSE THEY MUST BE PROVEN BEFORE AUTHORITY TO PROCEED CAN BE GIVEN, OR PERHAPS THE DILGENCE CLAUSE WILL PRECLUDE THE TIME REQUIRED TO DEVELOPE A NEW MARKET FOR A UNIQUE ELEMENT OR MINERAL DEPOSIT. THE CURRENT LAW WORK WELL IN THESE SITUATIONS.

THE 1872 MINING LAW IS A FREE ENTERPRISE--FREE MARKET SOLUTION TO THE HIGH-RISK AND COMPLEX BUSINESS OF EXPLORING FOR AND DEVELOPING NON-RENEWABLE MINERAL RESOURCES FOR AMERICAN SOCIETY. THE DEMAND FOR MINERALS TO MAINTAIN AMERICA'S COMPETIVENESS IN THE WORLD AND OUR STANDARD OF LIVING HAS NVER BEEN GREATER. THE 1872 MINING LAW IS A SIGNIFICANT FACT IN SUPPLYING THE 20 TONS OF MINERAL THAT EACH OF US NEEDS PER YEAR TO MAINTAIN OUR STANDARD OF LIVING.

THE 1872 MINING LAW HAS BEEN MODIFIED MANY TIMES OVER THE PAST CENTURY, PARTICULARLY DURING THE PAST FEW DECADES BY INNUMERABLE LOCAL, STATE, AND FEDERAL ENVIRONMENTAL AND RECLAMATION REGULATIONS AND LAW. IT IS NOT UNCOMMON FOR ANY SIZEABLE MINING OPERATION TO TAKE TEN(10) TO TWENTY(20) YEARS TO GET PROPER PERMITS FOR ZONING, ACCESS, WATER AND AIR POLLUTION, MINING PROCESSING AND RECLAMATION. SOME FAMILY OPERATIONS REQUIRE TWO(2) GENERATIONS TO GET THROUGH THE EXISTING LABYRINTH OF VALIDITY, PATENTING, LAND-USE RESTRICTIONS, PERMITTING AND RECLAMATION. MANY MINERS AND COMPANIES BELIEVE THE EASY PART OF DEVELPING A MINE IS MAKING THE DISCOVERY OF A VALUABLE MINERAL, THE HARDEST AND MOST EXPENSIVE PART IS JUMPING THROUGH ALL THE LOCAL, STATE, AND FEDERAL HOOPS TO BRING THE MINE INTO PRODUCTION. WE CITE FOR THE RECORD THREE PRIME CALIFORNIA EXAMPLES THAT TOOK ON THE ORDER OFTHIRTY YEARS TO BRING INTO PRODUCTION DEPOSITS OF REGIONAL OR WORLD CLASS SIGNIFICANCE: 1) WHITE KNOB (CHEMICAL/PIGMENT GRADE CACO$_3$), SAN BERNARDINO CO.; 2) MESQUITE MINE(AU), IMPERIAL CO.; AND 3) ANDREW MINE(CAWO$_4$), LOS ANGELES CO. DILGENCE CLAUSES IN THE PROPOSED NEW MINING LAW OF 1989 ARE TOTALLY UNREALISTIC. IT CAN TAKE YEARS TO GET THE PERMITS JUST TO EXPLORE AND OPERATE.

IF THE MINING LAW OF 1989 WERE PASSED IT WOULD CREATE FURTHER OPEN SEASON FOR UNDOCUMENTED, SUBJECTIVE, AND POLITICALLY MOTIVED DECISIONS BASED ON SO-CALLED ENVIRONMENTAL GROUNDS THAT WOULD MAKE MOST OF THE EXISTING DISCOVERY AND DEVELOPMENT PROCESS IMPOSSIBLE. IF PASSED THE PROPOSED LAW WOULD EXPORT MOST OF THE MINING INDUSTRY OVERSEAS, ALONG WITH THE TAXBASE, JOBS, AND MINING PROCESSING TECHNOLOGY; AND MAKE AMERICAN SOCIETY MORE DEPENDANT ON UNRELIABLE FOREIGN SOURCES AND CARTELS.

DURING THE 1960'S CONGRESS CHANGED THE DEPLETION ALLOWANCE FOR PETROLEUM. AS A RESULT AMERICAN INDUSTRY SENT THEIR PETROLEUM GEOLOGISTS IN SEARCH OF OIL TO OTHER PARTS OF THE FREE WORLD AND SOON THEY FOUND AND DEVELOPED THE MAJORITY OF THE FREE WORLDS OIL RESERVES. FOREIGN COUNTRIES FREE OF U.S. LAWS SETUP THE ARAB OIL EMBARGO, AND THE OPEC CARTEL. WE STOPPED EXPLORATION IN THE US. AND LOST OUR POSITION AS THE LARGEST WORLD OIL PRODUCER BY THE MID-1970'S. OUR OWN ENERGY POLICIES ACTUALLY FOSTERED THE CONDITIONS BY WHICH THE"ENERGY CRISIS" EVOLVED!

THE HVMD BELIEVES THAT WHEN THE U.S. HAS A SYSTEM THAT WORKS AS WELL AS THE EXISTING 1872 MINING LAW AS AMENDED FOR MORE THAN A CENTURY, IT WOULD BE FOOLISH TO TAMPER WITH IT JUST FOR THE SAKE OF CHANGE. THE HIGHER RISK AND LOWER PROFIT MARGIN OF HARDROCK MINING MAKE IT EXTREMELY SENSATIVE TO ANY CHANCES IN THE LAW.

RESPECTFULLY SUBMITTED,

HOLCOMB VALLEY MINING DISTRICT,

T. K. Webb

T. K. WEBB, CHAIRMAN
GOVERNMENTAL AFFAIRS COMMITTEE

cc: Rep. Jerry Lewis
Sen. James McClure
Sen. Pete Wilson
Gov. George Deukmejian
California Mining Assn

TOUCHSTONE
RESOURCES COMPANY
101-9 Carson Road
Post Office Box 250
Battle Mountain, Nevada
U.S.A. 89820
(702) 635-9040
Fax 702-635-9042

May 30, 1989

Mr. Donald Smith
President, Citizens for Mining
2057 Thomas Jefferson Ave.
Battle Mountain, NV 89820

Dear Don,

Thanks for the opportunity to review the May 5, 1989 draft mining bill (disposition of hard rock minerals on Federal lands).

It is a very onerous document that could have a very deleterious effect on the mining industry. In general it shows no acknowledgement of the fact that the bulk of hard rock mines are, by nature, short-lived; their continued operation is dependent on finding replacement deposits that is only possible if miners are able to draw on results of a vast exploration effort. This effort includes government researchers, universities and research institutions, large and small mining companies, and very large numbers of individual prospectors. Successful results could not be possible without the continued effort of all factions of this group. The general mood of this draft bill seems to be to stifle exploration.

I have attached a number of notes that are specific to the draft bill. They are not conclusive as there has not been enough time to review the document in detail. I believe they are sufficient, however, to support my contention that this potential modification to the Mining Law should be scrapped. Further work should concentrate instead on actual problems of the 1872 law including, for instance, the following:

- size of claims (the claim of 1872 doesn't relate well to most 1989 exploration projects)
- claim monumentation (too much, too costly and often an eyesore; perhaps better survey control of fewer points would help)
- discovery (difficult to demonstrate either pro or con; requirement should be eliminated)

a subsidiary of Cornucopia Resources Ltd

- retention of data gathered on a claim (much data is now lost resulting in much duplication of work)

Please use these notes any way that you see fit.

Sincerely,

Donald C Hruska
Donald C. Hruska
Project Manager

DH/lf/dhds0530.ltr

NOTES ON DRAFT HARD ROCK MINERALS BILL 5-14-89

Reference
(Page-Section)

3-102.g.1 - Locatable lands should include lands recommended for wilderness designation.

5-201 - No notification should be required just to prospect.

5-202.a - Why 20 acres? If change is in the wind, why not maximize at, say, a section (640 acres)?

6-202.b - $100 per claim recordation fee !? - way too much.

7-202.d.1 - Disapproval of plan makes claim null and void? - ridiculous. Why not change plan? Appeal?

GENERAL NOTE: No mining at all would be allowed unless patent issued which in turn is dependent on "commercial development". What's that? What time constraints? "Commercial" today isn't "commercial" tomorrow and visa versa!

10-203.d - 8% Federal royalty will eliminate most mines.

10-203.d - "production - - -" may be suspended for a "reasonable amount of time - - -" What is a "reasonable amount of time"?

11-203.f.4 - The mining and reclamation plan requires data that can only be obtained after doing impacting work (i.e., work that can't be done on "exploration claim").

12-204.a.1-3 - The dollar amounts in items 1-3 are way too high; they will eliminate the prospector.

12-204.a.1-3 - " - - - or contiguous group thereof"; "contiguous group" includes "intervening or adjacent lands in which the United States does not own the mineral resources - - -". Why should we pay the U.S. for land they have no control over?

12-204.b - "payment in lieu of labor" is a good idea

12-204.e.1 - $100/claim in addition to labor and royalty? - that's robbery.

DCH notes (cont.)

GENERAL NOTE: 8% royalty is too high. However, the idea of a depletion tax/royalty, if there must be one, paid to a single central agency is not too bad. If paid to the Feds then there should be no other equivalent state taxes.

Donald C. Hruska 5-30-89
Donald C. Hruska

THE COLORADO MINING ASSOCIATION
1340 Colorado State Bank Building, 1600 Broadway
Denver, Colorado 80202
(303) 894-0536

1989 OFFICERS

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June 20, 1989

The Honorable Jeff Bingaman
Chairman
Subcommittee on Mineral Resources
Development and Production
Committee on Energy and Natural Resources
United States Senate
SD-362 Dirkson Senate Office Building
Washington, D.C. 20510

RE: S.1126 - Mining Law of 1989

Dear Senator Bingaman:

The Colorado Mining Association (CMA) respectfully requests that this letter, and accompanying enclosure, be included in the record of the June 7, 1989, hearing before the Senate Mineral Resources Development and Production Subcommittee on the captioned proposed legislation.

The CMA believes that the General Mining Laws provide the best incentive for exploration and the most effective vehicle for assuring sound development of our Nation's mineral resources. They provide for non-exclusive access to public lands without imposing costly delays and without jeopardizing the security of tenure required to develop resources successfully. Existing law provides federal land-managing agencies with ample authority to protect the public lands from misuse. For example, use of mining claims for non-mining purposes already is prohibited, and the Forest Service and the BLM, by regulation, are able to deal with environmental quality matters on public lands. Royalties on locatable minerals on the public domain would raise the prices of mined products to the consumer, prevent the mining of lower grade deposits and lessen the incentive to engage in domestic mineral exploration.

The CMA endorses the statements made at the June 7, 1989 hearing, in support of the existing General Mining Law, by the American Mining Congress, Stephen D. Alfers, and others.

In addition, CMA submits the enclosed monograph entitled, **The Continuing Vitality of the General Mining Law,** prepared by the Colorado Mining Association, for the record.

We appreciate the opportunity to comment on the proposed legislation.

Sincerely yours,

COLORADO MINING ASSOCIATION

David R. Cole

David R. Cole
President

DRC:ak
mlr/31

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THE CONTINUING VITALITY

# of the

GENERAL MINING LAW

Prepared by
The Colorado Mining Association

The Mining Law of 1989, S.1126, was introduced in Congress on June 6, 1989, for the purpose of amending the General Mining Law. The Colorado Mining Association Declaration of Policy expresses the view that "the General Mining Laws provide the best incentive for exploration and the most effective vehicle for assuring sound development of our Nation's mineral resources." The recommendations for change to the mining laws are not only unnecessary, but would be counter productive.

In a March 1989 report, the General Accounting Office (GAO) reported that the minimum annual labor requirements of the law do not promote diligent development and that the patent provisions of the law are inconsistent with the Federal Land Policy and Management Act. The objectivity and the credibility of the GAO report have been widely questioned. The Colorado Mining Association (CMA) has reviewed the GAO report and disagrees with the report's findings and recommendations. The report contains a number of substantial factual inaccuracies and draws conclusions which do not have a necessary predicate in the factual findings.

The General Mining Law promotes the diligent development of the nation's mineral resources, and it conforms with current national natural resource policies. The mining law's hallmarks are the encouragement of the search for valuable minerals by those citizens of the United States who desire to spend their time, use their talents, and risk their money. By doing so, the persons making the mineral discovery have the protection of the right to own and produce those minerals. This encouragement of individual initiative and entrepreneurship could not be more in keeping with current national policy and current national need.

Individual prospectors and small or large corporations alike have the opportunity to seek out and develop so-called "hard rock" or "locatable" minerals in those remaining public lands which have not been placed "off-limits" to mineral exploration. The mining law enables the most economically efficient use of scarce capital and human resources in the search for, and development of, these mineral resources, and it minimizes expense to the taxpayer.

U.S. Bureau of Mines Information Circular 8862 (1981), reported land used for mining from 1930 through 1980 (51 years) amounted to 5.7 million acres or 0.25 percent of the total land mass of the United States. The amount of land used for mining is small compared with that devoted to other types of uses--agriculture, 70.0 percent; national parks, 3.4 percent; urban areas, 3.0 percent; transportation networks (highways, railroads, airports, etc.), 1.3 percent; Forest Service wilderness, 1.1 percent; and wildlife refuges, 3.9 percent. Public lands closed to mining have increased substantially since 1980.

The current upswing in minerals discovery and development activity repeats cycles of favorable minerals activity throughout the past 140 years in which national policy has maintained freedom of access to the nation's public lands for purposes of mineral development. The General Mining Law remains a modern, flexible, practical, and beneficial reflection of national natural resource policy precisely because it guarantees access to public lands for mineral exploration. It provides security of tenure for those who take the risk and make the investment to discover and develop the mineral resources which may be found in those lands.

This report contains several, brief case histories of individuals or small companies who have accepted the challenge of the United States to explore for minerals in the public lands. It has not been easy for any of them, and these prospectors and miners are only some of the few who have succeeded. Often, the success was obtained only after many others had failed, or after significant time, effort, and money over the years had been expended.

As these stories show, individual initiative has succeeded when either governmental policies or the decisions of large companies have failed. It is this opportunity to try to succeed which continues to attract the imagination and efforts of modern prospectors and miners, and which should be protected by the United States Congress. The ability of the nation to produce needed minerals depends upon preservation of the current law. The economics of many localities, western states, and the nation as a whole need this stability.

The first important point to remember about the General Mining Law is that a valid mining claim exists only when the prospector or miner has made a mineral discovery. Prior to that time, the law permits the miner to have a protected priority interest in the land when he is working on it to make a discovery. This is the most efficient way to deal with the question of diligent development of natural resources, because the miner is at once encouraged to seek the resources and admonished to be doing so diligently at the risk of losing his right to claim the land.

Consider Bob Sayre's story of the discovery of uranium at Mt. Taylor, New Mexico. Using his own initiative, five years after a major mining company had made a substantial uranium discovery in the same region, Sayre located mining claims on what he considered to be a potential ore deposit situated much deeper than those being developed by others. The mining law not only allowed him access to public lands to stake his claims, but it permitted him to maintain his right to these claims during the twelve years in which he was trying to interest someone with the substantial financial resources which were required to drill the deep holes necessary to verify his geologic theories. Not only was a major uranium ore reserve finally established through these efforts, but the mine which was developed is still operating at a profit, providing a domestic source of uranium and hundreds of good-paying jobs.

MT. TAYLOR DISCOVERY

In 1957 a **lone prospector**, Bob Sayre, subscribed to a theory that there could be uranium deposits under Mt. Taylor, west of Albuquerque, New Mexico. In 1952, Anaconda had discovered the huge Jackpile ore complex on the Laguna Reservation and by 1954 large deposits had been discovered at Ambrosia Lake about 30 miles to the west of the Jackpile, beyond Mt. Taylor.

Acting in accordance with the Mining Law of 1872, Sayre, all alone, located 120 unpatented claims in the Cibola National Forest on top of the volcanic flows of Mt. Taylor. No company with **resources sufficient to drill** on the claims was willing to undertake a drilling program, citing the **extreme drill depth** (4,000 ft.) as compared to the maximum drill depth of about 1,200 ft. theretofore drilled in the Ambrosia Lake area.

The **claims were dormant** until 1969 when Sayre returned and located an additional 525 claims. Sayre approached three large companies, none of which was interested due to the extreme drilling depth. Finally, a small company, the Bokum Corporation, leased some 625 claims from Sayre. Bokum built a rough drill road into the area and drilled the initial hole, which at a depth of just under 4,000 ft. penetrated 37 feet of 0.78% U_3O_8, probably the **richest exploration hole ever drilled** in the U.S. at that time.

A lawsuit filed in Federal Court by Keradamex, a Canadian company which had staked some of the same ground shortly after Sayre's staking, was settled by forming a joint Bokum-Keradamex venture, with Sayre as claim owner. Subsequent joint venture drilling proved up an ore reserve in excess of 100 million pounds of U_3O_8 at a mining grade of at least 10 pounds of U_3O_8 per ton (compared to about 2 or 3 pounds U_3O_8 per ton in other normal operations elsewhere).

Gulf Oil became interested and eventually bought out Keradamex, Bokum and Sayre. Gulf proceeded to spend more than 300 million dollars developing the deposit with two 3,800 ft. deep shafts, encountering rock temperatures of 130 degrees F. at this depth. Chevron acquired Gulf and is still operating the mine despite the current low price of uranium, milling the ore at Homestake's mill. All of these operations have **provided hundreds of jobs and have injected millions of dollars into New Mexico's economy.**

Conclusion: The discovery of this major, high grade deposit of ore, with its attendant contribution to the U.S. energy materials supply and its contribution to the economy of New

> Mexico, was made possible by the Mining Law of 1872. Only under that very practical law could an **individual prospector** have located and claimed sufficient acreage to encourage a small company to drill to "do the assessment work".
>
> Most of the major ore discoveries have been made as the result of **individual initiative.** The right of **individual initiative** must be maintained and the Mining Law of 1872, with its adaptation to modern mineral exploration, is the key to that all important **initiative.**
>
> Robert H. Sayre
> Consulting Mining Engineer
> 726 26 Road
> Grand Junction, CO 81506
> (303) 242-5611
> December 18, 1988

Diligent development is a concept which cannot be defined in the abstract. In the case of Mt. Taylor, it took twelve years for Mr. Sayre to encourage the taking of the substantial financial risk of the first deep drill hole. However, as he describes in his story of the Pandora Mine discovery, this same individual prospector was able to encourage a major mining company to drill another of his uranium prospects relatively soon after the claims were located. That mine is also still in operation.

PANDORA DISCOVERY

> In 1966 a **lone prospector,** Bob Sayre, had visualized a uranium ore "trend" in eastern Utah. This "trend" extended about twelve miles westward from the active La Sal Creek Mining District in western Montrose County to the Rattlesnake Mine in eastern San Juan County in Utah.
>
> Study of the San Juan County mining claim records indicated that lands in the Manti La Sal National Forest were open for location. In December 1966, Sayre, working alone, located 108 Pandora Claims just east of the village of La Sal. At first no major companies evidenced any interest, but by April 1967, American Metal Climax (AMAX) became interested and leased the claims from Sayre.
>
> Sayre recommeded the drilling of the first exploratory hole on the "trend" line through the claims. That **first exploratory hole penetrated two feet of good uranium ore** at 550 feet below surface. And that is how this major ore discovery was accomplished, proving ore at least **five miles from any previous significant ore discoveries.**
>
> AMAX continued drilling and blocked out an orebody containing several million pounds of U_3O_8. AMAX terminated its uranium operations and in 1973 Atlas Minerals acquired AMAX's lease on the Pandora Claims with Sayre continuing as

> owner and Lessor. Atlas sank an inclined shaft and developed the ore. The Pandora Mine constituted a principal source of uranium ore for Atlas' Mill in Moab, Utah, from 1973 to 1985 when the mill was shut down. In 1988 UMETCO, a subsidiary of Union Carbide, leased the Pandora from Sayre and is presently mining and shipping the ore to Blanding, Utah, for treatment.
>
> The Pandora Mine, together with Atlas' Moab Mill, provided a **substantial tax base and hundreds of jobs for Utah's San Juan and Grand Counties** for at least twelve years, and even now the mine is still in operation.
>
> **CONCLUSION:** The Mining Law of 1872 enabled an **individual prospector** to claim and hold about 2,000 acres until a company with sufficient funds for a drilling program finally became interested.
>
> Throughout mining history the majority of the important mineral discoveries have been made by individuals.
>
> **The Freedom for the Exercise of Individual Initiative in the Location of Mineral Properties Must be Maintained.**
>
> Robert H. Sayre
> Consulting Mining Engineer
> 726 26 Road
> Grand Junction, CO 81506
> (303) 242-5611
> April 22, 1989

Market factors had the greatest influence on the rapid development of the Pandora Mine, but demand sometimes develops slowly.

Ed Lippoth's story describes the impossibility of government action being able to make better decisions than the market place; rather, it skews the market. This story contains an example of a niobium and rare earths discovery which was confirmed almost thirty-five years ago. Advancements in technology are only now producing the demand for these minerals, but because they have been discovered and because of the protection provided to the claim owner by the General Mining law, they are available to be produced to meet this new demand.

MINERALS PRODUCTION: BOOMING AND LATE BLOOMING

> **After graduation from college with a degree** in Geology, I arrived in Grand Junction, Colorado, in 1951. The "uranium boom" had not yet developed and geology jobs were not that plentiful. The **government had calculated** the uranium reserves in the country at a few hundred thousand pounds, and the **government withdrew** from mineral entry what was considered the ground most likely to hold more uranium deposits. **They tried stimulating** uranium exploration on

other public lands with a guaranteed price and a bonus system.

A friend and I decided to buy a wagon drill and do contract drilling. We finally got our first drilling contract in the fall of 1952. The boom accelerated and our company expanded until we had three drills doing contract drilling, and one drill exploring around several small uranium mines we had leased and were mining.

The prospectors and miners did **too** good a job, for by 1957 the U.S. uranium reserves were calculated in the millions of pounds of U_3O_8....**more than the government ever needed or wanted**, so the government withdrew the bonus and guaranteed price and the uranaium boom was over in 1960.

During those years, 1952 to 1960, our company drilled hundreds of thousands of feet, and thousands of holes, for all kinds of clients - large companies, small companies, individuals, and ourselves. I will let you in on a little "secret"....**over 90% of those holes that we drilled had NO mineral** in them whatsoever, and of the remaining small percent that showed mineralization, only a small percentage of those penetrated ore grade mineralization. Most of the companies and individuals that we contracted for did not find anything and lost their money.

The newspapers only present the stories of the "big strike" and you never hear about the other **thousands who played the game and lost.** There is an old saying in the mining industry that "it would be better to have all the money that went **INTO** the ground rather than all the money that **CAME OUT** of the ground", and I believe it.

If you look a little deeper into the mining business, all the speculative money that goes into the ground and finds nothing is a hidden subsidy to our mineral industry, and when the cry goes up to get rid of the speculators, you are talking about getting rid of the entire mining industry! The dictionary defines speculation as "engagement in a business involving **considerable risk** but offering the chance of **large gains**" and that defines the mining industry.

I hear another cry coming out of Washington....change the Mining Law so that we can get rid of all the **non-producing mining claims** that are cluttering up the public domain....make it tough so these claimholders either produce minerals or get off the public domain. How shortsighted! Driving the claim holders off would be destroying our **strategic mineral reserve** and the ability of the domestic mining industry to respond in a timely fashion to our mineral needs.

The Mining Law covers all **"hard rock minerals"**....copper, lead, mercury, rare earths, uranium, gold, vanadium, etc., **each having its own economic cycle.** Fifteen years ago the price of uranium was up and the uranium claims were active. At the same time the price of gold was down and the gold claims were dormant. Now it is just the reverse with gold claims active and uranium claims are the non-producers. It is the same with every other mineral; **when the economics are there, the claims become active** and when the price is down they lay dormant waiting for the need and price to rise.

There is occurring at this time an example of this **flexible response** in the uranium/vanadium district around Naturita, Colorado. For some reason there is a shortage of vanadium and the spot price of vanadium has gone up. Uranium/vanadium claims that have been inactive for the last five years are being opened up and mined for vanadium. If these claim holders had been driven off their claims, the response would not have been nearly as quick.

Another long term example. In 1955 my company drilled a deposit of rare earths near Powderhorn, Colorado, for E.I. DuPont Company. Recently I read that Buttes Gas & Oil Company now holds these same claims and hopes to produce **niobium and rare earths** when the need arises. For 35 years people have held these non-producing claims waiting for the need for rare earths. This need may come about in the near future in connection with **super-conductivity and other advanced technology.**

I ask the Congress to be very careful about any changes in the Mining Law as I believe the present law has been very responsive to the country's mineral needs. **It takes time to open a mine and get it into production when you know where to start**; and it will take even greater time if you have to start from scratch with staking new claims and doing all the necessary land evaluation.

Edward M. Lippoth, President
Vital Mineral Exploration Company
2246 Knollwood Lane
Grand Junction, CO 81505
(303) 242-4290
March 28, 1989

Mr. Lippoth describes the well-known, cyclical nature of the hard rock minerals business. The "dormancy" of many mining claims is not contrary to national policy, nor is it wasteful of any resource. Contrary to the statements in the GAO report, no unnecessary damage must be done to the land in order to perform minimal annual mineral development (assessment) work. Quite to the contrary: both the Bureau of Land Management and the United States Forest Service regulate the environmental impacts of this mineral development activity as do various state reclamation regulations. Furthermore, miners are quite aware of the changed societal demands and national policies respecting the impacts of mining activities, and as a matter of self-interest, they do not engage in unnecessary land damaging activities which cost them additional money to repair.

Active mining claims can be developed promptly and efficiently to meet new or changing demands, whether they be for vanadium, copper, gold, uranium, or other minerals needed by our modern society. This responsiveness to mineral demands is accomplished by private enterprise without any expensive government studies, programs, or administrative supervision. What could be more cost-effective? What could be more diligent? What could be more in tune with current national policy?

Prospectors and miners do not discourage government studies, but rather they encourage them. These studies add to the body of knowledge which enables new mineral discoveries to be made. Dan Brown's story is a modern example of how someone can use his initiative to turn such information into a new business venture. It also shows how the General Mining Law continues to work today. Substantial capital investment will now be made in an economically depressed area, creating good jobs, local tax base, spinoff economic activity, as well as mineral wealth for the nation. Modern regulatory requirements were also met.

THE NEW GOLD DISCOVERY

> In reading the March issue of CMA Communicator I noticed your request for success stories relative to the use and implementation of the 1872 Mining Law.
>
> As a Colorado native I have always been fascinated with mining history and the pure courage of men and women who have made their dreams of success in years past become reality. Back then, it was called pioneering, now it's **entrepreneuring.** When I tell people my story they jump back and get this excited look in their eyes and say, "you're kidding me, people don't find gold mines anymore!", and I say, "Why not?, it's a form of utilizing the so-called **American Dream of creating opportunity.** The laws and guidelines can either liberate one's dream or, if abused, the laws will place the dream in bondage."
>
> My success was partially made so because **I followed the book** and made sure that if I didn't know I would ask. Nine times out of ten, those people whom I did ask (usually a government agency) were very knowledgable and pleasant to work with.
>
> My story begins with two guys sitting around on graveyard shift at a tunnel project **dreaming of discovering a gold mine.** Once this particular project was completed my friend, Tim Coffey, was laid off and began looking for work elsewhere as a geologist. During the summer of 1985, Tim was hired as a temporary employee by the BLM office in

Alamosa, Colorado. He and one other person were to **evaluate the economic resources** available throughout the San Luis Valley. This was a massive undertaking for two people, many hours were spent hiking around the mountains looking at everything from the giant Bonanza Mining District to the obscure little "gofer" hole. A tremendous amount of data had been accumulated identifying average ore grades, extent of old workings, and **much geologic information.**

The next task for Tim was to compile this investigation into **a professional paper issued by the BLM.** Needless to say, Tim was very excited because this was the first government paper he had participated in. So excited in fact that, when it became publicly available, he wanted me to read it ASAP. I did so, and in the process I discovered buried in the mass of data some **very good gold values located in an offbeat area.** While formulating the report, Tim was more attentive toward the quality of content and not really looking for a potential mining property. I became very excited about the opportunity at hand and was quick to po'nt this out to Tim saying, "This is it!" I must say it is ironic that the very agency administering the Mining Laws of 1872 also played a major role in creating our opportunity.

This particular area had been "gofer-holed" many years prior and there also exists a **sizable old mine developed in 1906.** I point this out because not only did that generation create opportunity, we also are doing the same in 1989, and in the same spot! I ask you, is this not considered a **renewable resource?** Tim and I put our heads together and have since invested about $10,000, many hours of court house research, and field work. In the process we have touched many lives and given the sleepy little town of **Villa Grove, Colorado,** a new topic at the local cafe and of course a **renewed hope of forward movement.**

Over the past three years we have **taken risk** both physically and economically to produce a **small new corporation** with the potential of providing economic growth and education about the mining business to many people. We are currently involved with a major mining company whose yearly gold production is over 150,000 oz. It is a fact that we, as a small company of prospectors and miners, impact the giants; for we **create opportunity for the big guys** too. Just the knowledge alone that I have acquired by **working with the process** from start to present has enhanced my life greatly and made it possible to be of service to others.

In closing, the story is one of many I'm sure. It is a story about a couple of guys who had a dream and did not have to go to a foreign country to realize it. When Americans **know the rules and follow them** persisting in their dreams, the existing mechanisms create balanced results. I suggest to those in Congress who are considering rewriting

> the 1872 Mining Law that a golden gloves approach be taken and consider the pride we all have toward the public domain for it is truly American!
>
> Daniel B. Brown, President
> B & C Mining Company, Inc.
> 905 Pitkin Avenue
> Glenwood Springs, CO 81601
> April 5, 1989

Sounds like the "American Dream", doesn't it? Well, mining is one activity in which the American dream still exists, and it can come true, thanks to the opportunity for individual initiative provided by the General Mining Law. Mining has always been an extremely difficult and very high risk endeavor. As more and more of the United States has been prospected, it has become more and more difficult to find new mineral resources. Precisely because a prospector or miner has the opportunity to develop what he finds, he is willing to do the hard work and take the high risk to look for those resources.

Today, as in the past, minerals development is occurring in the more sparsely settled parts of the country. This development is bringing economic activity to localities and states which sorely need it, and which have ability to accommodate the development and the population growth which result from successful mining endeavors.

THE AMERICAN DREAM

> The "American Dream" is still going strong in the mining industry; however, it is being stymied somewhat by the flood of regulations and restrictions. If the Mining Law of 1872 is rewritten or eliminated in favor of leasing, the dream will go down the drain as initiative is stifled.
>
> Western Colorado's best years were the result of many prospectors, engineers, geologists, and reputable promoters striving for that "dream". Today uranium may temporarily be a dirty word, but in the 50's and 60's, it brought together the largest assembly of real men and women striving for that dream. Many hundred were building the economies of Western Colorado and Eastern Utah, and later Wyoming and New Mexico.
>
> In earlier times, these dreams built settlements such as Aspen, Breckenridge, Ouray, Silverton, Gunnison, and many others. Sure they've had their ups and downs, but the spirit of those striving for the "American Dream" through prospecting and mining was the initial spark and spice that established these towns and revived them from time to time.
>
> In these times when we are a debtor nation, it would seem as if we'd do most everything possible to encourage individual initiative to start new projects, particularly in the mineral industries where we've become so dependent on

foreign ores, one factor in wrecking our **balance of trade.**

In my own case, only last week I was prospecting with a friend geologist. Neither of us need the money, but we enjoy the thrill of making a discovery and moving it to the point of production. This won't last under a different system.

Though most knowledgable men recognize the value of the **independent prospector** (prospecting geologists and engineers) today, their names aren't as common as the big companies such as Newmont, Phelps Dodge, American Smelting and Refining, etc.; but I assure you that without them, the major companies wouldn't last long in this country - foreign countries sure, and a worse trade balance. It is estimated that at least **75% of the discoveries** of uranium and gold of the last 50 years in the U.S. and Canada have been **made by individuals.**

I, and many like me in the west, have lived the "**American Dream**". After working my way and struggling through school at the University of Alaska and putting in several years with private industry, the U.S. Bureau of Mines and Geological Survey, I prospected with a small amount of family assistance, an understanding wife and a bunch of good kids, and was able to assemble a number of discoveries for a **small privately held company**, and mine, explore, and consult. In a small way this added to the holdings of major companies and eventually to my attaining the "American Dream" and indirectly **strengthening the United States.**

Please don't change the Mining Law of 1872 and in doing so destroy the **individual initiative** which made this country strong and will continue to rebuild our resources.

John I. Schumacher
Registered Professional Engineer (CO)
608 View Point Drive
Grand Junction, CO 81506
(303) 242-5499
March 15, 1989

Not only have yesterday's mining towns sometimes become today's recreation or tourism centers, or often merely nice places to live away from the major cities and population centers, but the transfer of land from public to private ownership through the mineral patent process has enabled many areas of the West to have enough property tax base to survive. It is often forgotten that the public land states of the West are severely impacted by the burden of public lands. Small acreages which have been patented under the various public land laws, including the General Mining Law, not only enable communities to be established, but they provide redevelopment opportunities when local economic cycles or mining cycles create the demand for additional lands.

Although mining patents account for relatively small acreages historically, and even smaller acreages today, their existence enables the private sector to permit miners to go back into older mining districts to develop resources which weren't found or developed the first, second, or third time. The miner historically has sought to re-explore older mining areas, and mineral patents often allow former public land to be mined at different times without any need for a government decision.

THE VALUE OF MINING PATENTS

> In the years between 1933 and 1956, when liberty and freedom still existed in the United States, it was easy for a young man to find something productive and lucrative to which he could devote his energy.
>
> A well-financed mining company had successfully developed and operated the **Ingram gold mine** in Boulder county. Deciding that it had mined all of the ore reserves it **agreed to sell the lease** and equipment.
>
> **A young fellow just out of college with a degree in Modern Languages** thought that he saw an opportunity, borrowed $700 from the bank, and bought the lease. During the next five years he produced a quarter million dollars in Ingram ore (the **equivalent of 3 1/2 million today**). Five men were employed for five years; the gross income - **clean, new wealth** - all went into Gross National Product. Therefore the government (the people) did receive its "fair share", - 100% of it!
>
> When the **Defense Department was scrambling for tungsten during World War II**, the same young fellow, Harrison Cobb, borrowed one of the new ultra-violet lamps from a friend and indulged in some midnight prospecting, **discovering the only commercial deposit of scheelite tungsten in Boulder district.** In the final few months of the war, the same five crew members produced $40,000 more than operating expenses.
>
> In the **next period of government need, the Korean conflict,** when Chinese tungsten was again cut off, and the army was fighting to hold the 54th Parallel because it kept the world's largest tungsten mine, the Sang Dong, on our side Cobb, with his crew, went to work again.
>
> Tom Weldon, A **Georgia sawmill operator**, pointed out that there was an almost unlimited quantity of **low-grade tungsten ore in the Boulder tungsten district** that the several expert mills were unable to treat.
>
> **Cobb and Weldon** built a 200 ton-per-day mill for $8,000, **acquired blanket leases** from the three major property owners, and between 1951 and 1956, produced and treated over 135,000 tons of tungsten ore becoming perhaps the **largest**

single producer, tonnage-wise, in the district's history.

Opportunities equal to these abound throughout the mining districts of Colorado. In the 1970's and 1980's, these opportunities were effectually precluded through the imposition of Federal and State regulations. And, of course, any proposed overhaul of the highly successful Mining Law will exacerbate this sad loss of our liberty and freedom.

* * * *

Here is a copy of a recent letter to the editor. You may have seen it.

A small gold mine in Boulder County operated through several years with a 5-man crew. Year after year, each man produced 1.62 ounces of gold every working day, right up until the government shut down the gold mines because of the second World War.

There were hundreds of these small mines throughout the Colorado Mineral Belt. There are scores of similar opportunities today, almost all of them precluded from working by over-regulation and bureaucratic controls.

If the small mine described above were working today, each man would be injecting almost $800 into Colorado's economy every working day. Multiply that by only one hundred 5-man crews and we come up with almost unbelievable but true figures of **some $400,000 per day that could be added to Colorado's economy.** We ought to become aware of this opportunity that is being overlooked or ignored. Colorado would do well to think carefully before begging foreigners to come in and bail it out of its economic troubles. It could go a long way toward lifting itself by its own bootstraps by utilizing its own natural resources.

* * * *

In reply to your questions, the **Ingram mine** was redeveloped in 1934 by the Mines Development Company of Detroit; later changing its name to Mining Association, Inc. It did operate profitably for three years. Herb Shotwell used to carry a thousand-dollar sack of high grade from shaft sinking to Boulder each afternoon for a while, and the rest of the ore went down to the company-owned Boulder Mill at Salina. After this kind of production, the low grade material just wasn't ore so in 1937 Mining Associates verbally let me take over and in 1938 made an official transfer of the lease. **These were patented claims.** There are so many opportunities on owned claims that I've actually staked only two or three claims.

The **scheelite was at the Ohio (patented) mine** owned by VCA (Vanadium Corp. of America). I went in to see Bob Sterling, VCA manager and local bank president, who said, "I don't think there's anything up there, but go ahead if you want to". Most of my "leases" have been verbal.

Financing the project? I already had an old truck and a couple of shovels, so I drove up the hill, made a couple of $50 per load trips per day for a week, then had the money to call the crew in. I've not made efforts to maintain property interests because the properties have usually been available next time, and usually next time it's another property.

My information about the Sang Dong mine came from Blair Burwell who had been there to see it. It was on the south side of the 54th, or whatever Parallel we were protecting during the Korean conflict. At this time, **two of the major property owners** in the Boulder tungsten district were producing at high rates but **were unable to handle the low grades** of ore efficiently. **So we took** over most of the low grade ores of the whole district including that from the Colorado Tungsten Corp., a Pennsylvania non-operator, that turned the whole property over to us.

I readily agree that the small mine operator cannot drill the 1,000 foot holes to find new ore bodies, as is being done in Nevada. However, my point is that there are **hundreds of small fortunes lying around, practically unknown to the large operators,** all of which profitable or not could **go into Gross National Income.** Only the **small size operator can do these opportunities efficiently,** but the regulators have in effect made such small scale efforts illegal.

Just as a matter of information: during the recent snowy weather, I've been going through my "Prospects" file, assay maps, old mine reports, and old-timers' stories, and have put together a 30 or 40 minute paper listing various mining opportunities that appear do-able (provided that there was a market).

There is no present plan for its use, and just a couple of thoughts on it. It ought not be wasted on small groups who would not be tempted to act beyond mild curiosity. And (2) it ought to be used to spark other prospect collectors in other districts to do the same thing, with a view toward creating general **public interest in and support for natural resource production.**

Harrison Cobb, Operator
Ingram Lease
2200 Apache Court
Ft. Collins, CO 80525
(303) 221-2311

January 22, 1989

The rebirth of the mining industry in the late 1980's has been led by precious metals discoveries and by the risk-taking of hundreds of individual prospectors, entrepreneurs, and "junior" mining companies. In some respects, this can be attributed to the nature of the precious metals business. But there is no doubt among miners in the United States and around the world that the freedom of access and security of tenure provided by our General Mining Law has attracted the high risk capital which our mining industry requires. We may have been too busy working to tell our story to the public which benefits from our success.

Individuals and junior companies make investment decisions, developing new minerals resources, thereby creating new wealth and providing new jobs, in many circumstances which would be ignored or neglected if the decisions were being made only by large companies or government agencies. These successful investments usually provide for junior companies to grow into substantial enterprises or for larger companies to acquire all or part of these mining properties, and to develop them further. This increases the potential for more efficient and complete development of the mineral resource through an ability to employ substantial capital and personnel resources, and to sustain this mineral production through national or global economic swings.

SEEDS OF WEALTH

When you **think of mining,** two images come to mind. The grizzly old prospector pick in hand out there looking for the Mother Lode, or the big multi-national corporation with its open pits and giant machinery. The old prospector is considered a thing of the past to most people, but this is not so!

The small exploration and mining operations are still with us, providing America with the fundamental seeds of wealth as they have for 200 years. **What is a small mine?** They range from the individual prospector to the Mom & Pop operation to small companies. It has been estimated that two thirds of all mine operations in the U.S. employ less than 50 people.

These small operations provide two benefits. They are **entrepreneurs taking that first risk** to discover and define a mineral resource. Once discovered, the prospect becomes **feed stock to larger companies** or will be developed as an independent operation. Either way the **country and the local economy benefits.**

In many ways the **small mine is like the small family farm.** It's a **way of life** as much as a job or business. We know that big corporations grow much of the food, but the farm life is still an ideal in our culture.

Living in Silverton, Colorado, I see the incredible fascination that hundreds of thousands of tourists have for our mining activities, both past and present. The roads we miners built are now used by Jeepers. Conflicts between the two are practically unknown.

The big problem for small mines today isn't so much the economics or technology of mining. Likewise we don't think that most people are anti-mining in this state. Rather that government, mainly Federal, seems determined to throw us small miners out with the regulatory bathwater.

Most of the environmental regulations coming from the EPA are geared to the big mining operation. No distinction is made for the small mine that by its very size does little impact or harm to the environment. Worse there seems to be no agency in the government whose job is to help a guy in these matters. The Bureau of Mines gives us technical help to be better miners, but its support and funding are limited.

I wonder what would have happened to the family farm if the EPA had been around in the "Dust Bowl" days of the 1930's. Poor farming techniques led to horrible soil erosion, water pollution, floods, and dust. Today's mentality would see lawsuits and criminal penalties together with unlimited liability slapped on those poor farmers of yesterday. Back then the government didn't do that, of course. They set up research programs to solve the problems, provided the farmer with new techniques and technology, and worked together with the local people. Wouldn't it be nice if that was how the government went about solving today's environmental concerns!

Well, the seeds are out there and the soil is fertile. Mining is re-emerging from terrible times, but the small mine, like the seed it is, requires some nurturing to grow into a beneficial operation. Our way of life, for the small miner and the country, depends on it.

William R. Jones, Owner
Root & Norton Assayers
P.O. Box 309
Silverton, CO 81433
(303) 387-5492
February 2, 1988

These are but a few of the thousands of success stories which are the direct result of our mining law. Yet success stories are few and far between in mining. Some observers of the hard minerals exploration effort have estimated that the chance of a given prospect being developed into a mine are from 1 in 200 to 1 in several thousand. Exploration is a very high risk business by its very nature, because exploration is a venture into the unknown, as are biological research or a space probe to Mars. Government agencies, large companies, small companies, and individual prospectors are wrong more often than not in this process.

The most important feature of exploration, whose goal is to assure adequate supplies of minerals required in our daily lives, is that all players have the ability to test their ideas, and if they fail, opportunity to test a new idea. This process of testing and retesting requires access to potentially mineral bearing regions, and in the Western United States this means access, under reasonable conditions, to public lands.

We encourage our fellow citizens to learn more about our industry and to see the benefits which it provides for all of us. Miners, like farmers, engage in one of the few endeavors that produces new wealth. Because this wealth is produced from the land, they care deeply about the land. They are independent, hardy, and remarkably self-sufficient. But they need a guarantee of access to those lands in order to pursue their livelihoods. And they need a guarantee that once they have made a mineral discovery, they will not have its development value diminished or taken from them.

THE COLORADO MINING ASSOCIATION

The Colorado Mining Association (CMA), established in 1876 and incorporated in 1897, is a trade association whose membership, numbering 125 companies and 1,100 individuals, is composed of both small and large enterprises engaged in the exploration for, production and refining of, metals, coal, oil shale and industrial minerals; firms that manufacture and distribute mining and mineral processing equipment and supplies; and other institutions serving the mineral industry.

1340 Colorado State Bank Building
1600 Broadway
Denver, CO 80202
(303) 894-0536
June 1989

mlr/29

HOFSTRA UNIVERSITY
HEMPSTEAD · NEW YORK 11550

SCHOOL OF LAW FACULTY

June 21, 1989

Hon. Jeff Bingaman
Chair, Subcommittee on Mineral Resources, Development and Production
Committee on Energy and Natural Resources
364 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Senator:

Thank you for this opportunity to submit comments for the record on proposed revisions of the 1872 Mining Law. I strongly support efforts to replace the 1872 Mining Law, and in particular favor S. 1126, Senator Bumpers' bill to provide for the disposition of hardrock minerals on public lands.

By now it is almost anachronistic to assert that the Mining Law of 1872 is an anachronism. Anachronistic not because the assertion is no longer true, but because it has been made so often through the years and, sadly, ignored. Thanks to the important work of your Committee this may now change. S. 1126 addresses the three major problems caused by the Mining Law: 1) an inadequate return for the citizen-owners of public minerals; 2) environmental degredation; and 3) speculative abuses.

As a small example of the archaism of the Mining Law, consider the absurdly low fee for which anyone may acquire title to the public lands of the United States: $5.00 an acre. One government study concluded that this paltry sum "barely covers expenses of making title on the part of the United States." That statement was made in 1880.

Today, the public revenue situation is worse, because the Law is not indexed for inflation. Factoring in the historic rate of inflation in the United States, my computations show that in 1988 the equivalent of $5.00 in 1880 would be $71.76. Whether S. 1126 passes or not, I suggest that it is incumbent upon Congress to at least index the Mining Law for inflation and charg twentieth century, rather than nineteenth century, prices to own a piece of America.

S. 1126 does better than index; it begins to provide some real return to the public by assessing an 8% royalty. In a book I co-authored four years ago, I recommended a leasing system with a 12.5% royalty. (See Public Domain, Private Dominion (1985 Sierra Club)). I still believe such a system is possible, and in fact it is used in certain national forests acquired by the United States and in the National Forests of Minnesota. But the patent system of S.1126, with a reversion to the government for failure to produce, is an important step in the right direction.

Senator Bumpers' bill also protects the environment of the public lands, most critically through its requirement that miners post a bond before beginning operation. I would add specific language to the bill that would make it clear, finally, that mining is not to be considered the highest use of public land, but that it is to be considered equally with all the other potential uses of public lands. Mining must be placed firmly within the multiple use system envisioned by Congress.

Finally, I support S. 1126 because it guards against speculation with the nation's mineral lands. The bill provides that any patents will revert to the government absent production, it provides for diligent development, and it provides that a patent will only issue if the Interior Secretary determines that a claim contains a "substantial hardrock mineral deposit capable of commercial development." This last requirement is most important because it should help end lengthy litigation in which mining interests claim that they should only be held to a more lenient "prudent man standard". The new standard created by Senator Bumpers' bill is not only good public policy, it even conforms with the original legislative intent of the Mining Law's framers. (See Comment, The 1872 Mining Law: Historical Origins of the Discovery rule, 53 U.Chi.L.Rev. 624 (1986)).

Thank you again for this opportunity to comment, and please advise me if there is anything further I can contribute to crafting this important legislation.

Sincerely,

Carl J. Mayer, Esq.
Assistant Professor of Law

cc: Committe Staff

CURTIS TUNGSTEN, INC.

PHILIP T. STAFFORD • Vice President–Industrial and Government Relations Director

P.O. BOX 182 • STERLING, VA • 22170 • (304) 725-0333

June 7, 1989

RE: S. 1126. Mining Law of 1989

Ms. Lisa Vehmas
Professional Staff Member
Senate Energy Subcommittee on Public Lands
Room 364, Dirksen Building
Washington, DC 20510

Dear Ms. Vehmas:

I am pleased to submit to you for inclusion in the Record the two enclosed items concernining the abovementioned bill:

(1) A letter from Ronald L. Curtis, C.E.O., Curtis Tungsten, Inc., 855 W. 23rd St., Upland, CA, 91786, who is a small miner now developing a tungsten mine in Los Angeles County, CA in the San Gabriel Mountains.

(2) A statement from Philip T Stafford, Director, Small Miners of America, an organization representing independent miners and prospectors, currently mostly in Western States. such as Nevada and California.

You told me on June 6, 1989 that these would be published as part of the Record. I do thank you indeed for your kind and efficient hand'our request.

Respectfully,

Philip T. Stafford

Philip T. Stafford

SMALL MINERS OF AMERICA, P.O. BOX 182, STERLING, VA, 22170

June 7, 1989

STATEMENT BY PHILIP T. STAFFORD ON BEHALF OF THE SMALL MINERS OF AMERICA CONCERNING THE PROPOSED "MINING LAW OF 1989", S.1126, 101st CONGRESS, 1st SESSION

The abovementioned bill, which is referred to as the "Mining Law of 1989" to replace the Mining Law of 1872, will destroy the small miner in the United States if enacted.

The United States of America since World War II has become progressively more mineral import dependent on foreign countries, most with unstable governments. This is in sharp contrast with Communist USSR and China, which essentilly produce most of their mineral needs, and export large amounts of most mineral commodities.

The United States from a national defense security viewpoint, as well as one of national economic security, cannot afford to become more mineral import dependent. Our country is well on its way to becoming a second-rate nation because of the mistaken belief that an information- and service-based economy can replace a raw materials/manufacturing-based economy. We must absolutely remain strong in the production of tangible materials. We cannot survive on no production.

The small miner in our country has been essential during the past 100 years and long before, particularly as to the finding of raw materials to feed the development of the United States. The Mining Law of 1872 has served us well since its inception and can continue to do so if left alone. To replace it with the proposed "Mining Law of 1989" is analogous to replacing the Constitution of the United States of America with a new constitution. Just to propose such a new mining law for our beloved country is insane.

Philip T Stafford

Philip T. Stafford
Director

CURTIS TUNGSTEN, INC.

855 W. 23rd ST, UPLAND CA 91786 • (714) 982-7412

June 6th 1989

Re: Revision of the 1872 Mining Act.
S. 1126, 101st Congress, 1st Session

Senator Dale Bumpers

Honorable Senator Bumpers;

The 1872 Mining Act is a "Gentleman's Agreement" to help protect the rights of the original locator of land that may have mineral potential.

The Small Miner, Prospector is the back-bone of our domestic mineral industry because without these individuals ALL the mineable world class deposits mined to date would not have been discovered.

The large mining companies will not spend money to finance people to try and find a potential mineable ore deposit, they instead finance people to find and locate the small miner, prospector that has already found the deposit.

The small miner, prospector's annual income is well below the poverty level and yet these individuals persist in their quest of the dream of finding " The Mother Lode" that would make all their efforts pay off.

Case in point is our deposit "the Andrew Mine". This was located in 1953 and now is the only mineable tungsten deposit in the United States. The 26 years of fighting Government agencies, Environmental groups, Conservation groups and Large Mining Companies will finally pay-off for the individuals involved as well as for the United States.

The United States has been dependent on forgien sources of Tungsten from China and recent events demonstrate that this source is unreliable at best.

To take away the "American Dream" from the small miner, prospector will cripple the domestic mineral industry and will change the United States to a second rate nation because we will become solely dependent on unreliable forgien sources of our nation's needed raw materials and minerals.

Sincerely

Ronald L Curtis

Ronald L. Curtis C.E.O.
SMALL MINER (15 YRS)

JUN 6 '89 10:34 NMA PAGE.02

NEVADA MINING ASSOCIATION

ONE EAST FIRST STREET, SUITE 900 · RENO, NEVADA 89501
RENO: (702) 323-8575 · FAX: (702) 323-0258
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CONSULTANT
W. HOWARD WINN

June 6, 1989

The Honorable Jeff Bingaman
Chairman on Mineral Resource
Production and Development
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Re: Senator Bumpers' Draft Mining Law Bill

Dear Mr. Chairman:

This letter is to express the concern the Nevada Mining Association (NMA) has over the introduction of a draft bill by Senator Bumpers entitled "The Mining Law of 1989".

The NMA received a copy of Senator Bumpers bill late last week. Preliminary responses from various members are overwhelmingly opposed to the provisions contained in Senator Bumpers' bill.

If enacted, this legislation would place exceptionally high economic burdens on Nevada's mining industry. Many low grade gold and other marginal producers will be forced to close as a result of this legislation.

The Nevada Mining Association is disappointed to learn that the hearings scheduled for June 7, 1989 are "by invitation only." The NMA represents the mining industry in the state with the largest amount of federal land and the largest number of unpatented mining claims. It is an unfortunate oversight we were not invited to represent our members at this hearing. The NMA would appreciate notification and an "invitation" to any future hearings which may be held concerning this bill or any other proposed legislation concerning the 1872 Mining Law.

NMA's membership supports the Mining Law of 1872. This law has worked well for over 100 years.

Thank you.

Sincerely,

L. Higgins

Lewis R. Higgins
NMA Executive Director

cc: Original to follow.

JUN.23 '89 08:38 KAISER STEEL 619 392 4257

CUSHENBURY MINE TRUST
P. O. BOX 7032
DESERT CENTER, CA. 92239

June 23, 1989

The Honorable Jeff Bingaman, Chairman
Subcommittee on Mineral Resources, Production and Development
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

Attn: Ms. Lisa Vehmas

Dear Mr. Chairman:

The Cushenbury Mine Trust will be adversely impacted by the proposed repeal of the 1872 Mining Law; on that basis the Trust strongly supports the retention of that law in its entirety and requests your consideration of the following comments in its support.

The Cushenbury Mine Trust is the holder of unpatented mining claims totaling approximately 10,000 acres and is the owner of additional patented and fee simple lands in San Bernardino County, California. Those claims contain significant reserves of whiting grade, metallurgical grade and cement grade limestone as well as sands and gravels.

These properties were formerly owned by Kaiser Steel Corporation and served as its sole source of metallurgical grade stone for its Fontana, California, steelmaking operations and were mined by Kaiser Cement and Gypsum Corporation as a major source of cement grade stone.

With the closure of the Kaiser steel mill in 1983, the Cushenbury Mine Trust was created by agreement between Kaiser and the United Steelworkers of America (AFLCIO). Ownership of the Cushenbury properties was transferred to the Trust by Kaiser with the sole intention that proceeds from mineral development on the property be used to provide for the medical care of the hourly retirees of the steel mill and their dependents.

Trust management has been working diligently to maximize revenues from the Cushenbury properties, yet the medical needs of the approximately 6,000 persons served by those revenues considerably exceed the Trust's ability to provide that care. Repeal of the 1872 Mining Law and its replacement by the bill currently under consideration by the Subcommittee will greatly exacerbate that shortfall.

It is difficult to list those aspects of the bill which are most onerous as the bill shows an ignorance of the time involved in bringing a mineral property into production and of mineral economics. A gross royalty payment would eliminate claim holders, such as the Trust, who must depend on others to develop the minerals on their claims and who receive only a small royalty themselves for their efforts. The exhorbitant annual expenditures required to hold a claim combined with the short life of a claim would eliminate the possibility of the Trust holding claims and defining ore reserves for future development. A patent's grant of only the right to mine without conveyance of title to the surface would eliminate future revenue streams that the Trust could otherwise realize once mineral values were exhausted.

The 1872 Mining Law is still a highly effective law promoting the development of the nation's mineral resources in an organized and efficient manner. Its repeal and replacement by the bill currently under Subcommittee consideration will devastate the nation's minerals industry in general and the Cushenbury Mine Trust in particular.

Sincerely yours,

CUSHENBURY MINE TRUST

Orlo J. Anderson

Orlo J. Anderson
Mining Manager

OJA/klv

cc: C. Bradford - CMT

6/21/89

Death Valley Chamber of Commerce
Tecopa — Shoshone — Furnace Creek
#2 Post Office Row
Tecopa, California 92389

FOR THE HEARING June7 1989, on S.1126 and 1872 MINING LAW
FOR INTRODUCTION AS TESTIMONY BEFORE THE U.S. SENATE
SUBCOMMITTEE ON MINERAL RESOURCE PRODUCTION AND
DEVELOPMENT
of the
Committee on Energy and Natural Resources
Honorable Jeff Bingaman, Chairman

Testimony Against Revision of the U.S. Mining Law and a Proposed "Mining Law of 1989" (S. 1126)

The Death Valley Chamber of Commerce presently consists of businesses from the eastern Death Valley Communities of Shoshone, Tecopa, Baker, and Furnace Creek, California, and Pahrump, Beatty, and Amargosa Valley, Nevada.

The Towns of Shoshone and Tecopa, California and Beatty, Nevada are located in the beautiful Amargosa Valley which parallels the eastern boundary of Death Valley National Monument. These towns are the "GATEWAYS" to Death Valley.

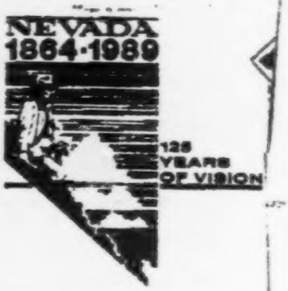
Until recently, working citizens of our communities existed primarily on mining in the National Monument and on tourism related jobs. Increasing environmental pressures and overseas competition have now closed down the rich talc and borate mines in Death Valley and left our southern communities with tourism only. Tourism alone does not seem to support the whole community and we hold out hope that the borate mines will find a way to reopen and compete or that some other mines in the area may come on line. Recent development of large gold resources in the Beatty, NV. area have brought an economic boom to the northern Amargosa Valley and the mining companies are working closely with state and local officials and are offering economic assistance to help the community school systems and living conditions.

Members of the Board of the Death Valley Chamber of Commerce are concerned to hear that some Senators are considering major changes to the Mining Law of 1872 because the proposed changes would invoke a strong negative effect on the economy and future economy of our area, and essentially turn our local area and eventually the nation into a 'service station for the rest of the world'. The Mining Law of 1872 has worked very well for over 100 years and together with the U.S. Constitution has helped us build the strongest free enterprise nation the world has ever known. Our nation has led the world and wishes to continue to lead in economic growth which is directly connected to our vast mineral wealth and our nation's ability to 'make ready today, the needs of tommorrow' (see Nevada State Logo). This vision of '**FUTURE**' built into the 1872 Mining Law allows, promotes, and rewards the great American ingenuity and individual free enterprise initiative that has given us the ability to maintain a competitive edge in the world's economy. Deviation from this basic concept has already hurt our economy and today some wish to destroy or drastically weaken the principles of the 1872 Mining Law that are even more valid and important to our nation's security and economic viability today than they were in 1872.

JUN 22 '89 10:12 AMERICAN [illegible]

Gateway Gazette Friday, June 16, 1989 / 5A

Carson City aritist wins logo contest



Nevada Secretary of State Frankie Sue Del Papa announced that Verne Horton, a Carson City based graphic artist, submitted the winning design in the state of Nevada's 125th Anniversary Logo Contest.

Appearing at a morning press conference at the Reno offices of International Game Technology (IGT), a co-sponsor of the contest, Secretary Del Papa said, "While there were many excellent designs submitted, Mr. Horton's logo best told Nevada's story."

The Secretary of State said that Horton's design, which utilizes the theme, "125 Years of Vision," will be used in the coming year on selected state publications and commemorative items that celebrate the state's 125th birthday, which is October 31, 1989.

Horton, who operates a graphic arts studio in Carson City, was on hand to receive his grand prize during the press conference — a video poker machine courtesy of IGT.

Secretary Del Papa noted that last week Governor Bob Miller signed Assembly Bill 409, which empowers the governor to appoint a nine-member Nevada 125th Anniversary Commission to develop special events and promotional items in conjunction with the state's 125th birthday. The bill also designates October 31, 1989 to October 1, 1990 as Nevada's 125th Anniversary Year.

Ironically, while Horton's winning design depicts a 19th century miner looking out over a field of clouds, he is better known as a watercolor fine artist who specializes in painting steam locomotives of the American West.

Horton, who is a member of the elite "Society of Steam Era Artists of America," has had his work exhibited at the International Railroad Art Exhibition at the Nevada State Museum in Las Vegas, the Nevada State Railroad Museum in Carson City and the California State Railroad Museum in Sacramento.

He resides in a restored 1874 Victorian home in Carson City with his wife.

NEW NEVADA STATE LOGO
DEPICTS THE IMPORTANCE OF
THE SMALL MINER FOR
125 YEARS

[illegible]

Our vast national wealth based on raw resources and our ability and willingness to utilize these resources in the most efficient and environmentally sound manners, under the 1872 Mining Law and its Amendments, have given our country the opportunity and wealth to become the world leader in environmental conscience. With present day mining operations spending millions of dollars on pre-mining environmental impact studies and post-mining land reclamation work, it seems ironic that those same "environmental" lobby groups that owe much of their existence to the wealth of this nation and in turn to the 1872 Mining Law priciples seem determined to destroy free enterprise mining in the United States of America.

The nature of the "environmental" lobby group's past and present proposed laws and revisions drives resource exploration and development costs and incentive out of the hands of the major force of explorationists in our country, the small miner or business man. This most recent proposal (S. 1126) by Senator Dale Bumper's with its royalty leasing system and highly inflated fees would descriminate against and destroy the small miner and explorationist in the United States, and in turn would bring about a rapid economic cancer in America which would start at the basic local rural community level and spread throughout the country to erode the pillars of economic strength and destroy the future of our children. It is this deep concern for the future of our local area and the nation, and an insight into over 100 years of mining in our area that prompts the Death Valley Chamber of Commerce to strongly protest Senator Bumper's S.1126 and unneccessary revisions to the 1872 Mining Law. The Death Valley Chamber of Commerce concurs with the American Mining Congress' denunciation of the G.A.C. Report entitled 'The Mining Law of 1872 Needs Revision' on the grounds that this report seems to have been obviously structured and does not follow scientific reporting guidelines. We suggest that any changes in the Mining Law of 1872 or Regulations regarding the law should be worked out between the Land Managing Agencies and the people who know mining the best, the miners. The State Mining Associations and Mining Councils would be most willing to clarify any vagueness in regulations and law to land managers or Congress. In fact, some of the small miner's associations in northern California have already set up interactive programs with the Bureau of Land Management to insure environmental bonding where needed and resolve problems. If anything, the mineral resource development industry needs help (Minerals Policy Act Of 1979) not more hinderance, because our counties, states, and nation need help.

The Death Valley Chamber of Commerce wishes to sincerely thank the Subcommittee on Mineral Resource Production and Development for this opportunity to express our right of free speech and we sincerely hope that the Congress of the United States of America will continue to allow us to express our right of FREE ENTERPRISE.

Signed:

President
Paul A. Watkins

President Elect

Executive Secretary
Martha C. Watkins

Vice President

Vice President
Charles Garrett proxy verbal

Vice President
Marian Peck

P.W. GILLIBRAND COMPANY
Asphalt Paving Materials
ROCK • SAND • GRAVEL
INDUSTRIAL SANDS AND MINERALS

June 22, 1989

Honorable Senator Jeff Bingaman
Chairman, Mining & Development Subcommittee
U.S. SENATE
Hart Senate Building
Washington, D.C. 20510-3102

Dear Senator Bingaman:

Please give your careful attention to the Bumpers Mining Law Bill. The terms of the bill will stifle the future of the mining industry in the United States. The proposal will particularly inhibit the small miner. Overly restrictive reform of the 1872 general Mining Law comes at a time when continued free enterprise exploration is vital to encouraging domestic mineral development, boosting the national economy, and offsetting the foreign balance of trade.

The Bumpers Bill, while seeking to deter real estate speculation and provide fair revenue for the public, will produce negative effects that will ultimately place a much greater burden on the taxpayer. Regardless of good intent, this legislation simply does not hit the mark. The changes are too drastic for the welfare of the industry.

Why not take a more moderate approach to mineral reform. The 1872 Mining Law has been in use for 117 years because it is an effective law. It continues to serve the legitimate miner well and is no more out of date than the free enterprise system. Environmental protection and reclamation are already mandated by more recent laws that are applicable to all mining on federal lands.

Keep the patenting rules in tact; they have just been simplified to benefit the taxpayer and claimant. Give the small prospector his continued opportunity to succeed in this highly competitive industrial climate.

5131 TAPO CANYON ROAD • P.O. BOX 3476 • SIMI VALLEY, CALIFORNIA 93063 • LIC. #172714-A
(805) 526-2195 • (818) 340-3830 • FAX (805) 522-4031

Thank you for opposing the new Mining Law of 1989. I sincerely appreciate your support.

Respectfully,

P. W. GILLIBRAND CO.

Phil

P. W. Gillibrand

PWG/jmh
ccs: Charles S. Cushman, NIA
Karl H. Bertelsen
Jess Barton
Frank Cullen
File

VADA NORTH RESOURCES TEL No.714-951-5884 Jun 22.89 16:21 No.002 P.01

**NEVADA
NORTH
RESOURCES, (USA) INC.**

June 22, 1989

The Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral Resources,
Development and Production
Committee on Energy and Natural Resources
SD 364 Dirksen Senate Office Building
Washington, DC 20510

RE: Draft Bill To Repeal The Existing Mining Law of 1872 (S 1126)

Dear Senator Bingaman:

I want you to know that the above company vehemently opposes Senator Bumper's "Mining Law of 1989" for the following reasons:

1. The existing law has worked for over 100 years - "if it ain't broke, don't fix it."

2. The United States should not export yet another industry - pretty soon there won't be any left. No jobs, no opportunities. This is serious!

3. As I'm sure you are aware, more jobs are created by small companies than by large companies, and a high percentage of ore bodies are still being discovered by individual prospectors. The proposed $100 filing fee and $1,000 annual assessment work requirement will kill individual mining efforts.

4. The proposed 8% royalty (tax) will prohibit anyone from even thinking about mining activity. This is a ruinous burden to place on any business!

Please place this letter in Congressional Records.

Yours very truly,

Walter E. Ferrell

Walter E. Ferrell
Co-Founder and Director

WEF:r

Administrative Office: 23811 Bridger Road, # 104 El Toro, California 92630 Tel. (714) 951-8123 Fax (714) 951-5884 Fax

PLUESS-STAUFER (CALIFORNIA) INC.

P.O. BOX 825, LUCERNE VALLEY, CA. 92356 TEL. (619) 248-7306 FAX: (619) 248-9116

The Honorable Senator Jeff Bingham
Chairman of the Mining and Development Subcommittee
The Senate of the United States
Washington, D.C.

Attn: Lisa Vehmas

YOUR REF. OUR REF. LUCERNE VALLEY June 21, 1989

Dear Senator Bingham:

Pluess-Staufer (California), Inc., is a major manufacturer of high quality limestone products in the West. Our operation is based upon several deposits which we are leasing from individuals and small groups who discovered and developed them under existing law.

The law has functioned well, giving incentive to the entrepreneur to do the research and development investment to find the deposits, allowing Pluess-Staufer (California) to have an economically feasible raw material in a low margin business, giving employment to 70+ individuals in the Lucerne Valley area, and providing an economically sound source of a much used commodity to a variety of industries.

We are concerned that a major change in the Mining Law of 1872 could take away the incentive for finding new deposits and/or make them uneconomical to develop. It is vital to us that we continue to find and develop economic reserves. We feel that the individual free enterprise approach under current law is the best one. We strongly urge you to carefully review the implications of modifying a law which has served and is serving so well.

Very Truly Yours,
PLUESS-STAUFER (California), INC.

Steve Scott
President

SS/kmh

A.B.C. Mill
Box610 Rt. 15
Amargosa Valley, NV.
AMERICAN
BORATE
COMPANY

JUNE 20, 1989

TESTIMONY FOR INTRODUCTION TO THE HEARING ON JUNE 7, 1989
ON S.1126 and THE 1872 MINING LAW

to the

SUBCOMMITTEE ON MINERAL RESOURCE PRODUCTION AND DEVELOPMENT
Honorable Jeff Bingaman, Chairman

American Borate Company has been mining borate minerals in Death Valley, and exploring present borate trends for more reserve outside Death Valley since 1980. All development and exploration activities are conducted under stringent environmental regulations administered by the Bureau of Land Management in the California Desert, and the National Park Service in Death Valley.

It is with deep concern that American Borate Company views the S.1126 attempt to repeal the Mining Law of 1872 and its individual initiative system of free enterprise. An adoption of S.1126 would replace a good working law with a law that would cripple our nation's mineral resource development capability. The 1872 Mining Law is NOT out of date; it is even more important today than it was in 1872; rather that S.1126 is out of place.

Increasing restrictions and costs and fees on mining have already made it nearly uneconomical to produce talc and borates in the U.S., and many metal mines are on the cutting edge of competitive viability in the world market. American Borate Company is presently on temporary shut down while Turkey holds our share of the borate market, and Pfizer Minerals has permanently shut down its Death Valley talc operations to go mine in China.

S.1126 will destroy the small mining business and prospectors; and thereby, decrease the exploration capability of our country (possibly up to 50%).

This lack of exploration will in turn and in time, drastically limit production of needed raw mineral materials from the United States.

A common mining industry comment at the recent (March, 1989) U.S.Geological Survey and Industry joint McKelvey Forum in Reno, NV. was that a large percentage, in some cases 60%, of larger mining company exploration programs is submittals from small miners. The McKelvey Forum explored the latest exploration innovations and efforts of industry and the U. S. Geological Survey to locate buried or hidden ore resources in the United States.

The recent reporting by the U.S. General Accounting Office and subsequently numerous newspapers that the cost to patent mining claims is $2.50 to $5.00 per acre is absolutely false. By the time a mining claim and its reserve are located, staked, filed, explored, drilled, proven, and tested for economic viability, the cost to patent can usually exceed $2000 to $4000 per acre. Under the present Mining Law and regulations, all claims requesting patent must undergo thourough State and Federal mineral examinations and surveys to prove their economic wealth. If economic viability and use for mineral development does not exist, the claim cannot be patented.

American Borate Company supports the 1872 Mining Law and does not believe any revision is necessary. The recent G.A.O. report on the Mining Law is a seriously flawed document, as noted by the American Mining Congress, and it should not be viewed as a scientific study.

American Borate Co. thanks the Subcommittee for this opportunity to speak against S.1126 and sincerely hopes that this proposal will be withdrawn in favor of the present workable guidelines of the 1872 Mining Law and its amendments which promote the utilization of our nation's resources in conjunction with environmental protection.

Sincerely,

Frederic C. Johnson
Geologist
American Borate Company

Senator Jeff Bingaman
Chairman of the Subcommittee on
Mineral Resources, Development and
Production of the Committee on
Energy and Natural Resources.
United States Senate

Dear Mr. Chairman:

This letter concerns the proposed 1989 Mining Law bill.

Montana mines produce a variety of precious metals, base metals and non-metals for use around this country and the world. A wide range of people including geologists, miners, prospectors and suppliers as well as truckers, loggers, engineers, electricians, surveyors and office personnel are directly involved in the industry; many more are also involved indirectly. In the state of Montana, over 3,600 people are employed by working mines and another approximately 5,400 people are directly involved in the prospecting, exploration and development of possible mining properties. In all, about 10% of Montana's population is directly affected by the mining industry.

A drastic change in the 1872 mining law as now proposed by Senator Bumpers would effect all of these positions. Certainly many small communities and likely the entire state of Montana would be adversely affected as would many similar communities around the country.

Points in the bill that will do the most harm to the thousands of Montanans directly dependant on the mining industry include:

-the proposed 8% of gross royalty payment
-annual filing fee of $100 per claim
-recordation fee of $100 per claim
-decreased claim size to 20 acres

The 8% royalty would prevent many small companies from developing a mining property as it would no longer be economically feasible to extract ore.

The annual filing fee of $100 per claim would create a severe financial strain on companies holding large blocks of claims and could also prevent mine development.

The recordation fee of $100 per claim is also a financial strain; the cost of the paper work involved in recording a claim is merely a fraction of that amount.

The combination of the above plus the decreased claim size would put many mining companies out of business and would severely hurt the local economies in Montana and other states.

Not only is the mining industry concerned about the local economies, but also about the environment. Strict state and federal environmental regulations are followed and the people in the mining industry genuinely care about the local economies and surrounding environment.

There is no reason to make this proposed bill law. Help keep this major economic force in Montana and other needy states by not passing this bill.

Sincerely,

Susan Ungemach
Daniel L. Myers
Jim Rogers
Denise Saunders
Derek L Feebach
Brent L. Heath
Don Herberger
Gisela Toth Herberger

June 22, 1989

Denise M. Saunders
P.O. Box 1486
Libby, Montana 59923

Senator Jeff Bingaman
Chairman of the Subcommittee on
Mineral Resources, Development and
Production of the Committee on
Energy and Natural Resources.
United States Senate

Dear Mr. Chairman:

I would like to voice my concern about Senator Dale Bumper's bill recently introduced to alter the 1872 Mining Law. I believe that if a bill is reported by either Senate or House committees to rewrite the 1872 Mining Law in any way, it must retain the concepts that will foster a sound and healthy domestic mining industry. If the law is changed according to this bill, the industry's ability to explore on public lands could be altered radically. A leasing system limiting access to public lands would not provide the miner with the necessary security or tenure to explore and develop mines. For those experienced in the mining industry, the impact of this bill is far reaching. Without incentive and financing, mining companies of all sizes will be greatly hindered. Without mining on all scales, this country will become more and more dependent on foreign sources for all metals and oil and gas. In spite of a relatively small direct impact on employment statistics in the U.S., the extent of indirect impact is enormous.

The 1872 Mining Law has accomodated mineral booms and busts, pervasive environmental regulation and modern land-use planning. It is a comprehensive and predictable body of law. Mines are being discovered, in spite of geological and logistical difficulties, environmental and land-use issues are being incorporated into mine plans. Rather than making it virtually impossible for that to happen, why not concentrate on improving and refining environmental requirements and mining company-sensitivity to them. As an employee of a mining company which is in the process of permitting a large, environmentally sensitive property in northwest Montana, I feel strongly that such a sweeping reform as is presented in Bumper's bill is unnecessary and much more harmful, in the short and long terms, to the American mining industry, and thus the American people.

Very truly yours,

Denise Saunders

Denise Saunders
Project Geologist

dS

Kaiser Steel
Resources

Kaiser Eagle Mountain, Inc.
Post Office Box 37
Desert Center, California 92239
(619) 392-4257
(619) 392-4341 Telecopier

June 23, 1989

The Honorable Jeff Bingaman, Chairman
Subcommittee on Mineral Resources, Production and Development
Committee on Energy and Natural Resources
United States Senate
Washington, DC 20510

Attn: [redacted]

Dear Mr. Chairman:

Kaiser Steel Resources, Inc., will be greatly and adversely impacted by the proposed repeal of the 1872 Mining Law; on that basis Kaiser Steel strongly supports the retention of that law in its entirety and requests your consideration of the following comments in the support.

Kaiser Steel Corporation was a major west coast steel producer for almost forty years when it was forced to close its California steelmaking operation in 1983. Following acquisition of the company by corporate raiders in a highly leveraged buyout and the subsequent wasting of its assets, current management, supported by preferred stockholders, gained control of the corporation.

By that time, the corporations financial condition was so precarious that current management was forced to seek protection under Chapter 11 of the U. S. Bankruptcy Codes in February 1987. Following acceptance by the court of a plan of reorganization, the company emerged from its status under Chapter 11 as Kaiser Steel Resources, Inc., in November 1988.

While under Chapter 11, Kaiser was not able to meet its pension obligations for thousands of retirees nor honor its pledge to provide medical benefits. The retirees are currently covered by the Pension Benefit Guarantee Corporation in regard to pensions.

Through several agencies, the retirees own 59 percent of the reorganized corporation. These individuals, numbering approximately 7,000, and their dependents will, consequently, benefit from Kaiser's financial recovery. An important component of that recovery involves the redevelopment of its mining properties.

Kaiser's holdings include 236 unpatented mining claims and 483 millsite claims as well as fee simple properties and patented mining claims. Kaiser is currently attempting to re-establish mining on several of its properties as a lessor to firms that are financially able to fund such ventures and is attempting to attract other industrial activities to its patented claims and fee simple properties. Passage of the bill currently under consideration by the Subcommittee will seriously impair Kaiser's recovery.

As a lessor, Kaiser's income from its mining properties will consist of a small royalty. Consequently, the payment of a gross royalty as the bill under consideration requires to mine a claim will greatly diminish or even eliminate Kaiser's income from its holdings or increase the cost of the product possibly reducing demand.

Holders of mining properties are expected to expend exhorbitant amounts annually to maintain their properties. The bill under consideration fails to recognize the impact of these costs, the risks involved in minerals exploration and development, and the lengthy time frame between discovery and positive cash flow from a mineral property.

Patents which grant only a right to mine the minerals without the conveyance of surface rights deny the patentee the opportunity to develop future revenue streams from the property once mineral values are exhausted.

It is difficult to determine which aspects of the proposed bill are most onerous to the mining industry in general and to Kaiser Steel in particular. Enactment into law of such a bill as is currently under study by the Subcommittee is certain to have a devastating effect upon the planned recovery of Kaiser Steel and, consequently, upon its retirees and their dependents.

Sincerely yours,

KAISER STEEL RESOURCES, INC.

Orlo J. Anderson

Orlo J. Anderson
Manager Mining Properties

OJA/klv

89 JUN 20 AM 9:42

June 16, 1989

The Honorable Jeff Bingaman
Chairman
Subcommittee on Mineral Resource
   Production and Development
Committee on Energy and Natural Resources
United States Senate
Washington, DC   20510

RE: S. ____ : MINING LAW OF 1989 - SENATOR DALE BUMPERS

Dear Senator Bingaman,

Recently I was provided a copy of the draft bill of Senator Dale Bumper's Mining Law of 1989, introduced in the Senate Energy Committee June 6, 1989. I would like to respectfully submit my comments and observations regarding the bill which might assist you in your analysis.

Briefly, I have been involved in land acquisition and administration for over 14 years. From this viewpoint, I see that Senator Bumper's bill would have a serious impact on the present day mining industry. For example, the additional costs for claim recordation, annual assessment work expenditures, holding and surface use fees, and the Eight (8%) royalty would literally drive the small owner and operator out of the mining business. These small owners and operators play a vital role in the present day mining industry. In many cases they are the ones that identify potential ore bodies from "grassroots" exploration efforts. They either develop the ore body themselves, or transfer the property to a "major" mining company for development and production. Conversely, if a "major" mining company identifies a small or low-grade reserve which may be incompatible with corporate goals, then the "major" can transfer the property to the small operator for development. Most small operators work with limited amounts of cash. Substantially increasing their overhead and holding costs, as Senator Bumper's bill proposes to do, will seriously reduce if not completely obliterate the small owner/operator.

The impact of such increased costs among the larger mining companies may also cause serious redirections of capital from exploration into further acquisition of assets from other mining companies, i.e. the small owner/operator.

As a final result, the capital and manpower to perform the exploration necessary to locate, identify and develop resources would be seriously hampered.

In addition, the increased overhead and holding costs will have a serious impact on the Industrial Minerals industry, particularly those that mine locatable minerals such as talc, calcium carbonate, etc. The profit margin on these commodites is very low. The increased costs postured in Senator Bumper's bill would most probably make the production costs so high for these commodities that they would not be profitable to mine any longer. Industries such as paper manufacturers, cosmetics and pharmaceuticals would most likely feel the impacts of this, and probably fairly quickly.

I am also strenously opposed to such a high royalty. Most mining companies, small and large alike, would agree that an Eight percent (8%) royalty is higher than most companies pay to owners of known reserves, let alone exploration properties. Should the government impose this royalty, it would make it impossible as well as uneconomic for a mining company to grant any further royalties to underlying claim owners, and hence compromise a key negotiating tool.

I have many other comments, but they can all be summed up in this conclusion: I urge the Senate Energy Committee to reject this bill from further consideration and draft another bill which would have fewer impacts on the struggling mining industry. The U.S. mining industry has been a foundation that this great country has been built on. Let's not see it brutally battered and crumble before us.

Please feel free to call me if you have any questions. My telephone number during the day is (702) 829-4440 or (702) 345-7511 in the evening.

Sincerely,

Deborah L. Goetz
P.O. Box 859
Verdi, Nevada 89439-0859